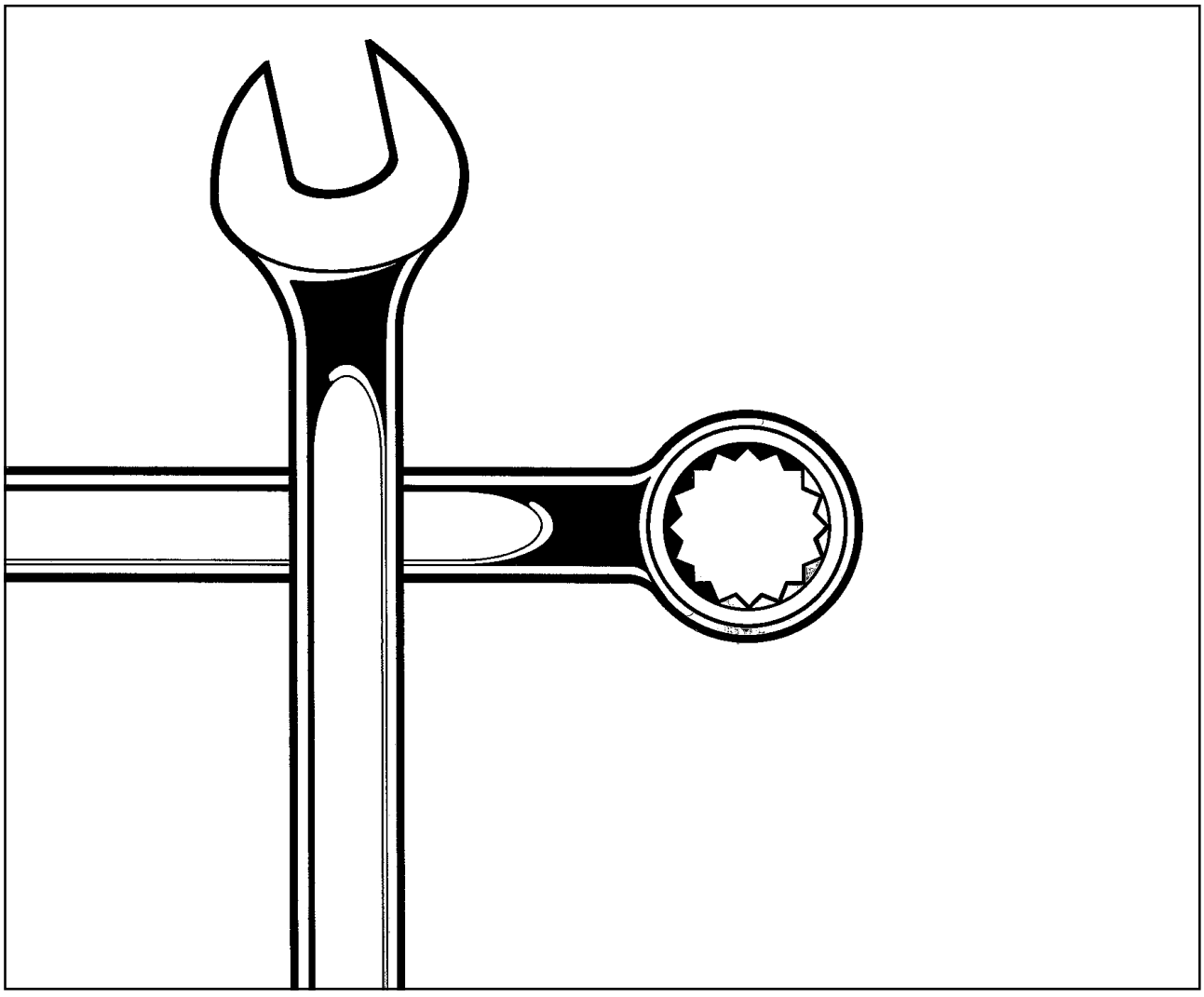
SVEDALA COMPACTION AND PAVING

DYNAPAC CA 152 WORKSHOP MANUAL WHEEL AXLE

W1055EN1



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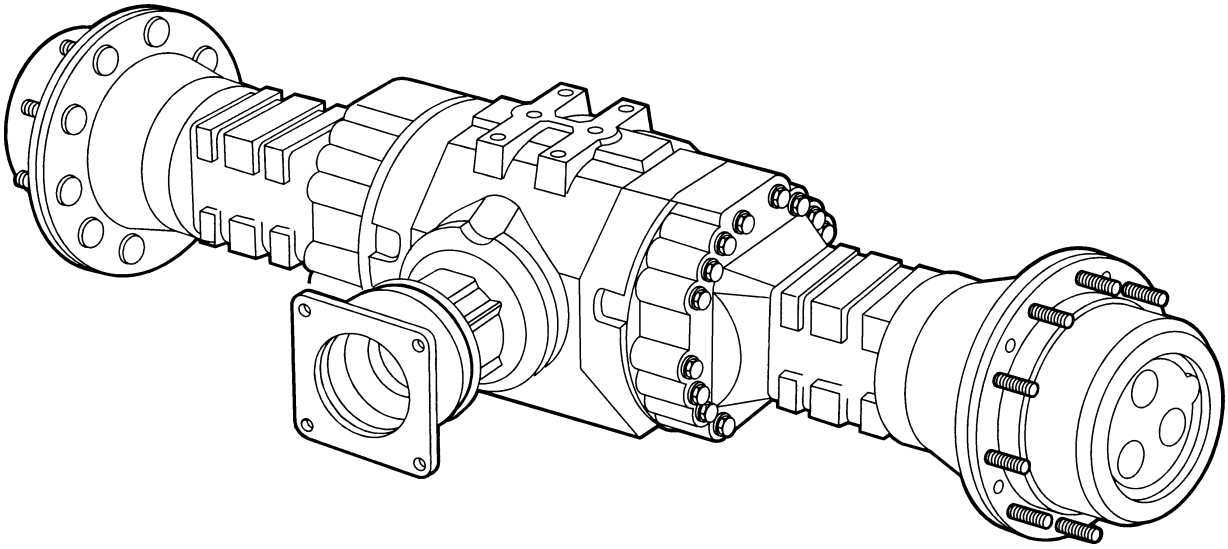
Vibratory Rollers
CA 152

Work Shop Manual, Wheel Axle
W1055EN1, 98-04-20

Valid for Wheel Axle:
Part No *37 15 93*
Part No *37 29 40*



We reserve the right to change specifications without notice.
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CONTENTS

Page
Introduction 3
Safety precautions 4
Lubricants and symbols 5
Specifications 5, 6, 7
Brake check 8
Brake adjustment 9
Disassembly axle from roller 10
Preventive check-up 11
Planetary gears - Disassembly 12, 13
Planetary gears - Assembly 14, 15
Brakes - Disassembly 16
Brakes - Assembly 17
Differential - Pinion housing, Disassembly 18
Differential - Crown wheel, Removal 19, 20
Differential - Carrier, Disassembly (P/N 37 15 93) ... 21, 22
Differential - Carrier, Assembly (P/N 37 15 93) 23
Differential - Carrier, Disassembly (P/N 37 29 40) 24
Differential - Carrier, Assembly (P/N 37 29 40) 25, 26
Differential - Measuring and Assembly 27-31
Differential - Mounting 32, 33
Assembly axle to roller 34
Starting up 35
Conversion table 36
Torque table 36
Special tools 37-42
Contact Pattern 43
Trouble shooting 44, 45
Exploded views 46-55

WARNING SYMBOLS

WARNING

Safety instructions – Personal safety

Special caution – Machine or component damage

Axle type plate

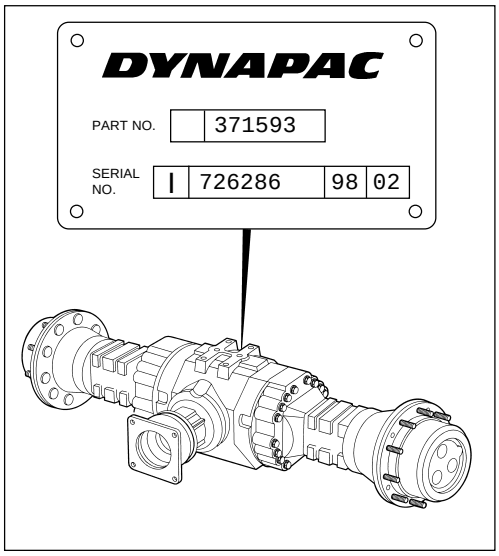


Fig. 1 Axle type plate location

The axle type plate is located on top of the differential housing. The plate shows the manufacturer's name, part number (type of axle), PIN "Part Identification Number" (serial number), year and month of manufacture. Please state the PIN-number (serial number) of the axle when ordering spares.

All disassembled mechanical units should be thoroughly cleaned using appropriate cleaning agent. Parts that show signs of damage, seizure, cracks or extreme wear should be remedied or replaced.

In particular, carefully check the status of all moving parts (such as bearings, gears, shafts) and seals (o-rings, oil shields) which are subject to major stress and wear. It is recommended to replace seals every time a unit is overhauled or repaired. During assembly, seal rings must be lubricated on the sealing surface. In case of bevel gear wheel or pinion shaft failure, replacement of both as a kit is necessary.

During assembly, the prescribed preloading and backlash of the parts must be obtained.

The use of precision instruments such as, dial gauge, vernier caliper, micrometer, caliper, slip gauges and surface plate, is recommended.

For press fits, it is adviceable to use a high sensitive mechanical press rather than a hydraulic one.

Comply with the torque wrench settings of bolts and nuts on page 36. Make sure your torque wrench is in good order.

Exploded views

The exploded views (16422 - 16425, 16497) are the same as in the SPARE PARTS CATALOG, with the same position numbers. All position numbers in the smaller pictures refers to the appropriate exploded view stated in the page heading. The exploded views are in the end of the this book.

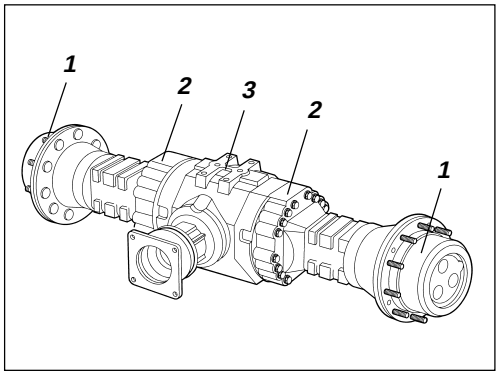


Fig. 2 Different axle parts
1. Planetary gears
2. Brakes
3. Differential

This wheel axle is mounted as standard on Dynapac CA 152. In this workshop manual the axle is divided in three different parts.

Part 1 is the planetary gears (view 16425, page 52), part 2 is the brakes (view 16424, page 50) and part 3 is the differential (view 16423, page 46 and 16497, page 48).

The differential is of a "limited slip" model, axle P/N 37 15 93 and can optional be equiped with a "no spin" model, axle P/N 37 29 40.

SAFETY PRECAUTIONS

WARNING

1. **Read and clearly understand WORKSHOP MANUAL before performing any maintenance or repairs on the wheel axle.**
2. **Observe and follow all maintenance and service instructions.**
3. **Do not remove/assembly axle from machine unless qualified by training or experience.**
4. **Do not operate roller if wheel axle is in need of repair or adjustment.**
5. **Obey all safety rules and use safety equipment provided for the job.**
6. **Block drums and/or tires and apply steering lock before servicing or repairing wheel axle.**
7. **Do not modify the wheel axle in any way which will affect safety. Any modification on this axle requires prior written approval from Svedala Dynapac.**
8. **Do not operate machine until hydraulic oil has reached operating temperature. Braking distance can be extended when oil is cold. See starting instruction in OPERATING MANUAL.**

LUBRICANTS AND SYMBOLS

Always use high-quality lubricants, in the quantities specified. Excess grease or oil can promote overheating, resulting in premature wear.

HYDRAULIC FLUID ambient air temperature -10°C – +40°C (14°F – 104°F)	Shell Tellus Oil TX68 or corresponding
ambient air temperature above +40°C (above +104°F)	**Shell Tellus Oil T100 or corresponding**
TRANSMISSION OIL, ambient air temperature -15°C – +40°C (5°F – 104°F)	Shell Spirax SAE 80W/90, HD API, GL-5
ambient air temperature above +40°C (above +104°F)	**Shell Spirax HD85W/140 or corresponding**

When driving in extremely high or low ambient temperatures, other lubricants are needed. Contact Svedala Dynapac.

Hydraulic fluid tank, level	Transmission, oil level
Oil for lubrication	

SPECIFICATIONS

Weights and dimensions	**37 15 93**	**37 29 40**
Weight, kg (lbs)	300 (661.4)	300 (661.4)
Length, without planet carrier, mm (in)	1270 (50.0)	1270 (50.0)
Lenght, with planet carrier, mm (in)	1530 (60.2)	1530 (60.2)
Width, with differential cover, mm (in)	520,5 (20.5)	520,5 (20.5)
Height, mm (in)	270 (10.6)	270 (10.6)

Fluid volumes	**Litre (gal or qts)**
Axle 37 15 93:	
• Differential	6 l (6.3 qts)
• Planetary gears	0,75 l (0.8 qts) / each side
Axle 37 29 40:	
• Differential	6 l (6.3 qts)
• Planetary gears	0,75 l (0.8 qts) / each side

Rear view

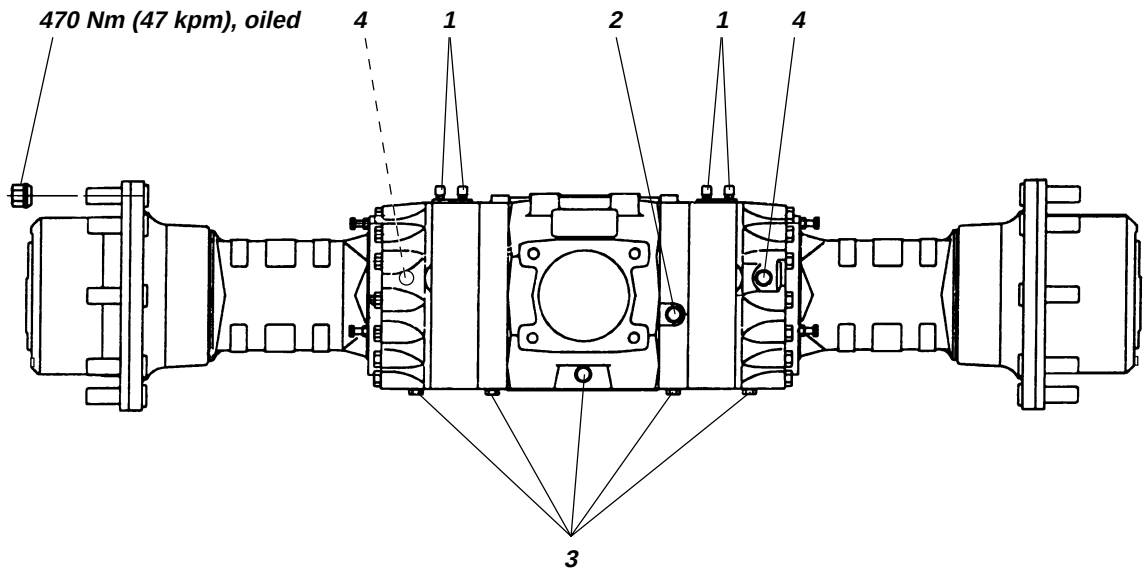


Fig. 3 Wheel axle, rear view

1. *Oil recovery for failsafe brake, breathers mounted (4x)*
2. *Oil level plugs*
3. *Magnet plugs, oil drain*
4. *Oil filling plugs*

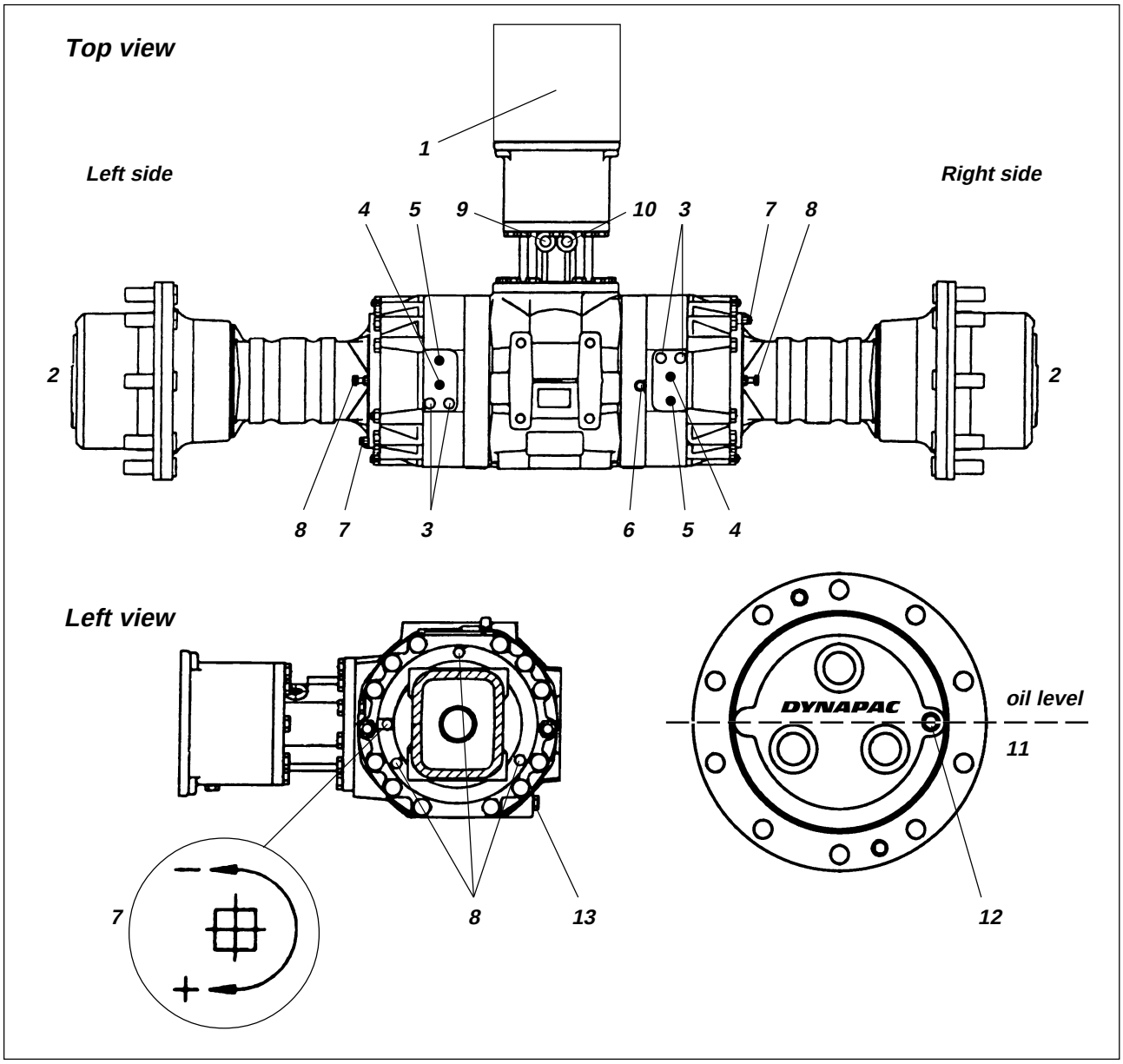


Fig. 4 Wheel axle, top and left view

1. *Hydraulic motor*
2. *Planetary reduction gear end, right and left*
3. *Oil recovery for failsafe brake, breathers mounted (4x)*
4. *Bleeding screw for failsafe brake (2x)*
5. *Connector for hydraulic fluid to brake, working pressure min. 14 bar (203 lbs/in^2) - max. 30 bar (435 lbs/in^2)*
6. *Breather*
7. *Disc play adjustment screw (2x), four turns á 0,188 mm (0.0074 in) =* ***0,75 mm (0.03 in)***
8. *Manual brake release screw (6x). To release the failsafe brake mechanically, set the screws by hand until stop. Then torque each screw one turn.*
9. *Threaded hole for speedometer sensor*
10. *Threaded hole for CCS sensor*
11. *Planetary gear end, oil quantity 0,75 litres (0.8 qts)*
12. *Oil charge and level plug*
13. *Oil drain plug*

Brake function – Check

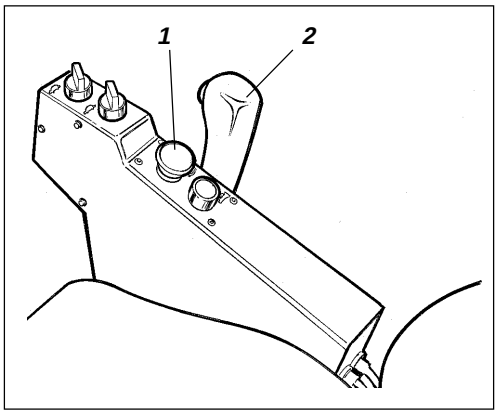


Fig. 5 Control panel
1. Reserve brake control
2. Forward/reverse lever

WARNING

Check brake function as follows:

Drive the machine forward **slowly**.

Press the reserve brake control (1). The brake warning lamp on the instrument panel, refer to OPERATION MANUAL for various levers, lamps and their functions, should now come on and the machine should come to a standstill.

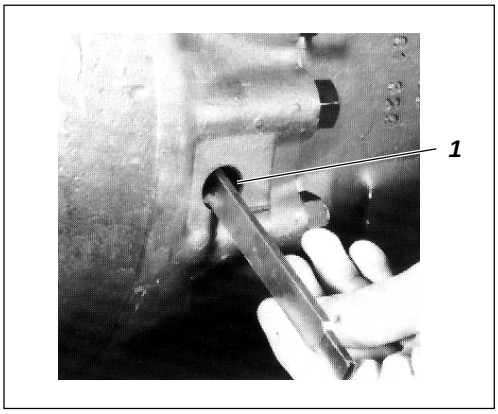


Fig. 6 Checking brake disc thickness
1. Oil charge hole

If the brakes have an uneven braking effect or the braking distance is longer than normal, check the brake disc thickness and/or perform an adjustment of the brakes.

Perform this check by removing the oil charge/level plug in the brake part of the axle, see 3, and insert a measuring instrument and measure the distance between the brake discs.

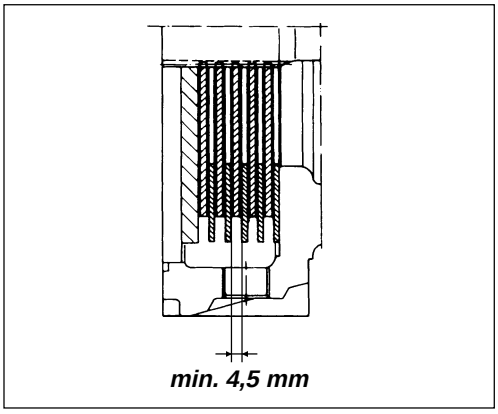


Fig. 7 Minimum brake disc thickness

The discs can be used to a minimum thickness of 4,5 mm (0.18 in). If the discs are thinner they must be replaced, see chapter BRAKE, DISASSEMBLY.

After the brake check, place the forward/reverse lever (2) in neutral.

Pull up the reserve brake control.

The machine is now ready to drive.

Adjustment of the brakes

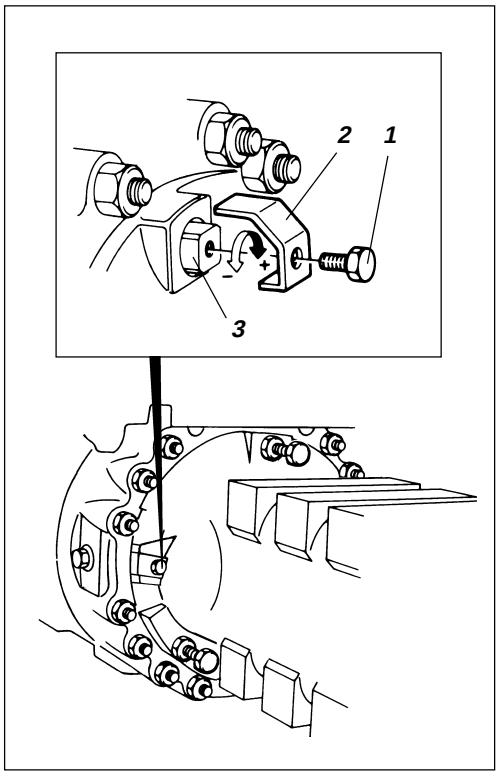


Fig. 8 Brake adjustment
1. Screw
2. Locking tab
3. Adjusting screw

Smaller adjustments may be performed from outside on this axle (P/N 37 15 93 and 37 29 40).
Refers to brake torque specification.

For major adjustments and brake disc replacement, see chapter BRAKE, DISASSEMBLY, page 16.

1. Undo screw (1) and remove locking tab (2)

2. Pressurize the brake, min 1.5 MPa (15 bar) and max 3.0 MPa (30 bar). If the axle is still mounted in a machine, start the engine. Otherwise use an external pump, see fig 9.

3. Turn adjusting screw (3) with a spanner counter-clockwise until a firm stop is obtained.

4. Thereafter, turn adjusting screw (3) clockwise four complete turns. Each turn allow 0,188 mm (0,0074 in) play and four turns 0,75 mm (0,03 in) which is the specified brake disc play.

5 Fit back the locking tab (2) and screw (1).

This adjustment may be performed on both sides of the axle.

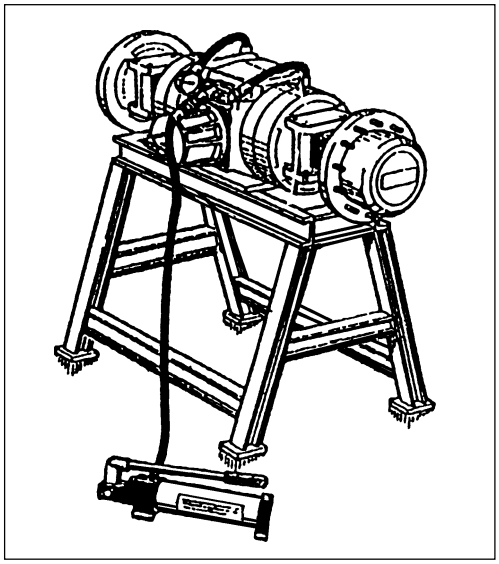


Fig. 9 Pressurizing the brakes

Locking the articulated joint

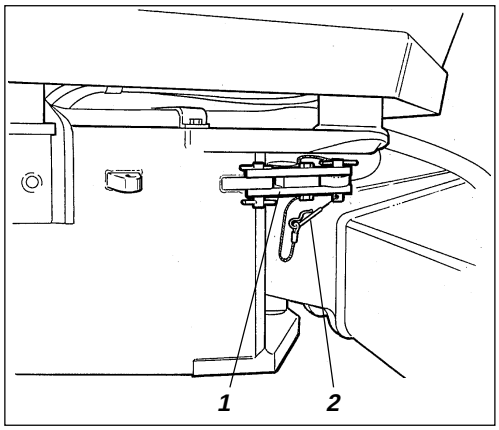


Fig. 10 Right side of articulation
1. Articulation in interlocked mode
2. Locking cotter

WARNING

To prevent turning, the steering mechanism must be locked before hoisting/jacking up the roller. Move out the arm (1) and secure it with the cotter (2) to the rear frame of the machine. Connect the lifting chains, ensuring that no parts will be crushed when hoisting.

Lifting tackle, such as chains, steel wires, hydraulic jack, jackstands etc, must be dimensioned in conformance with current regulations. When lifting see OPERATION MANUAL.

1. Lock articulated joint, fig 10, and block the roller.

Removing hydraulic motor

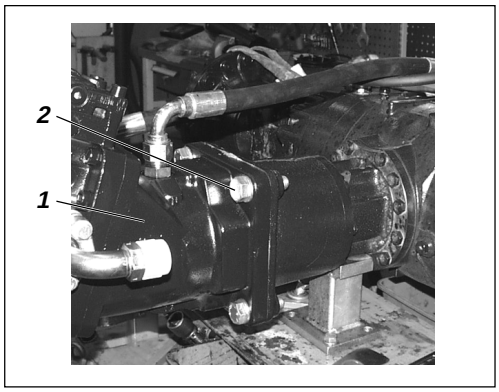


Fig. 11 Hydraulic motor mounted on axle
1. Hydraulic motor
2. Screws, 4x

2. Jack up/lift the roller as much that the wheel goes clear from the ground and remove the wheels.

The wheels are very heavy, especially the liquid ballasted ones.

3. Drain the oil from the axle, see MAINTENANCE MANUAL.

4. Remove the cover plate underneath the hydraulic motor.

5. Remove, and plug, all the hydraulic (brake) hoses from the axle.

6. Remove the screws (2, fig 11) holding the hydraulic motor (1, fig 11) and separate it from the axle.

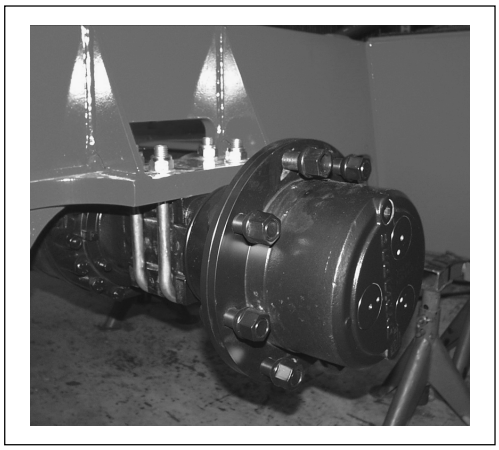


Fig. 12 Remove the screws from the tractor frame

7. Remove the screws holding the axle in the tractor frame and remove the axle from the roller.

Put the axle in an axle stand for best and easiest repair or maintenance. Dynapac have a special axle stand P/N 12 21 91, see page 37.

It is important to check **before and after** carrying out repairs.

1. Check operation of the failsafe brake separately:

Left side

a) Pressurize the RIGHT brake circuit 1.5 to 3.0 MPa (15 to 30 bar) or mechanically release the brake.

b) Check rotating torque on the pinion shaft using a torque wrench and the splined socket 12 29 66, fig 86. The ideal rotating torque on **each** side without lubricant is:

- with new brake discs: min. 800 Nm (80 kpm)

Right side

a) Pressurize the LEFT brake circuit 1.5 to 3.0 MPa (15 to 30 bar) or mechanically release the brake.

b) Proceed as under ”Left side b)”.

In order to simplify this check, use tool kit 90 08 46 if axle is removed from vehicle or engine not functioning.

The tool kit consists of the parts shown in fig 88.

- Install a 60 bar pressure gauge to test nipple (3, fig. 88) to check the brake release pressure (max 30 bar).

- Apply pressure to one side at a time (select side with the threeway valve (2, fig. 88).

- When one side is pressurized (brake released) the braking torque on the other side can be checked by using a torque wrench and socket 12 29 66 on pinion shaft, fig 13. To do this check, the axle motor has to be removed after oil level is lowered from the center part of axle. Both sides of the axle must be checked and adjusted if required.

After repair, check operation of fail safe brake several times on each side to settle the brake components and obtain consistant result. Thus, operate the brake several times by pressurizing and releasing the circuit pressure between each test.

2. Check the rotating torque of the transmission:

a) Pressurize the brake on **both** sides 1.5 to 3.0 MPa (15 to 30 bar) or mechanically release the brake.

b) Check the rotating torque on the pinion shaft. The ideal rotating torque is:

- with new components: min. 6 to 8 Nm (0.6 - 0.8 kpm)

- with used components: min. 1 to 1.6 Nm (0.1 - 0.16 kpm)

Checking braking torque

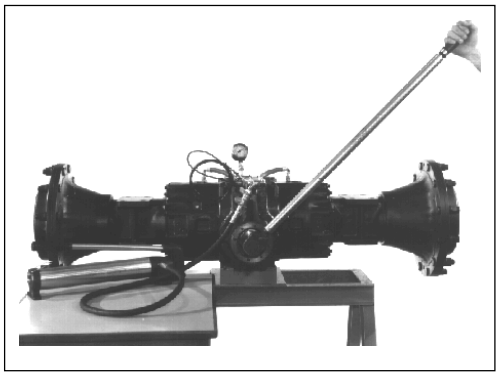


Fig. 13 Checking braking torque

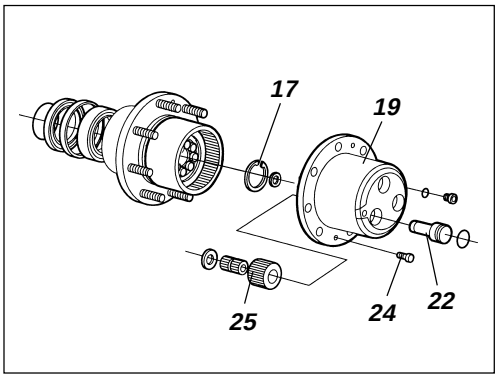


Fig. 14 Wheel hub, planetary gear

Drain the oil from the wheel hub, see MAINTENANCE MANUAL.

1. Remove the 2 screws (24).

   Before taking out the cover (19), make sure you mark both covers so you can mount the planetary gear carrier back at the same place.

2. Take out cover (19) with the complete planetary gear carrier.

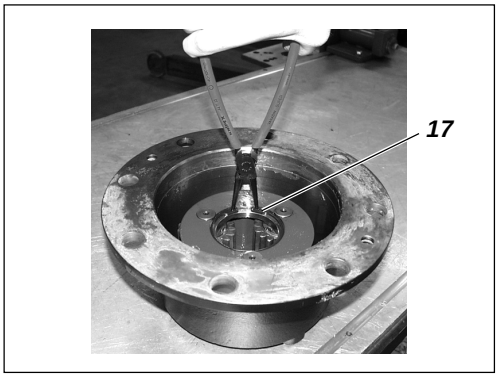


Fig. 15 Removing circlip from planetary gear carrier

3. Put the planetary gear carrier upside down and remove the circlip (17).

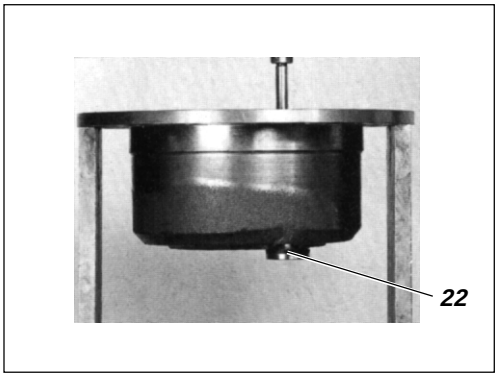


Fig. 16 Removing shafts

3. Remove all 3 shafts (22) before you can take out the planetary gears (25) through the center hole of the cover (19).

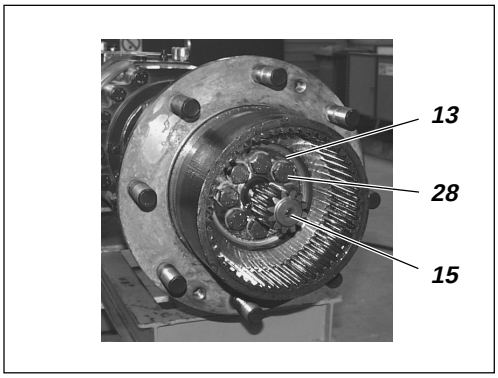


Fig. 17 Ring gear

4. Release eventual hydraulic pressure from the brake circuit so that the discs cannot fall down and pull thereafter out the shaft (15).

5. Loosen screws (28) some turns. Place a spacer on the screw heads. Let the puller rest on the spacer, check that the arms are tight to the ring gear and then pull out the ring gear.

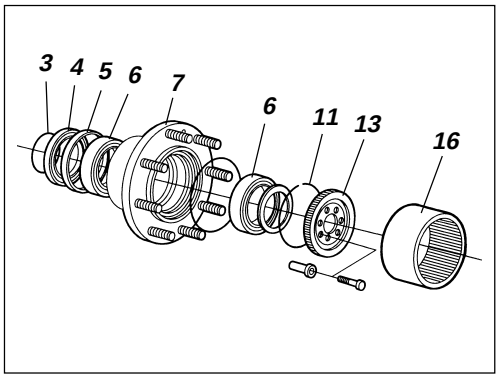


Fig. 18 Ring gear

6. To separate the ring gear (16) from the flange (13) remove snap ring (11).

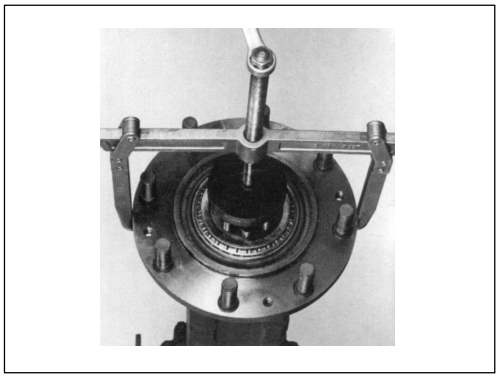


Fig. 19 Removing hub

7. Use support under puller spindle through bolt holes.
8. Pull out wheel hub (7).
9. Remove outer race of bearing (6, fig 18) from hub and inner race (6, fig 18) from axle housing.

   Take out and replace seal ring (5), remove spacer (4), see location in fig 18.

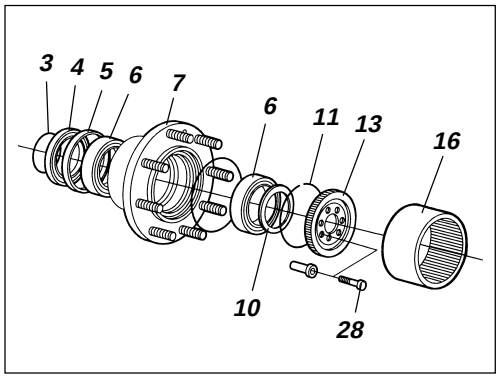


Fig. 20 Ring gear

1. Check the wheel hub bearings (6) for damage. Replace if necessary.
   Replace o-ring (3) and seal ring (5).

2. Fit new o-ring (3), spacer (4), seal (5) and inner race of bearing (30) to axle housing.

3. Install the wheel hub (7) onto axle housing and push in the bearing race (6).

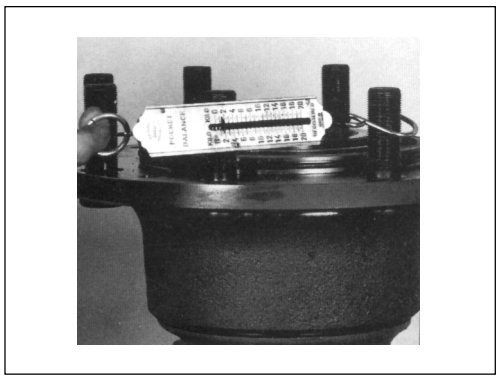


Fig. 21 Checking tangential force

4. Check the rotation torque, allowing the taper bearing a slight end play. The tangential force must be 20 - 30 N.

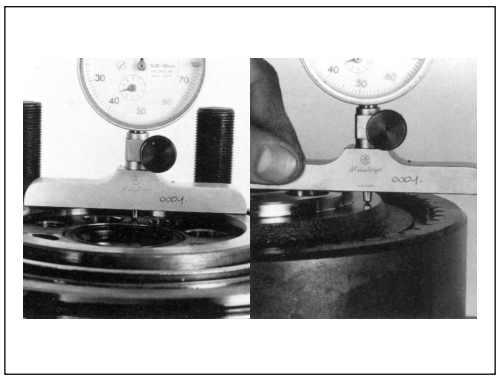


Fig. 22 Measuring the difference

5. Measure the difference to establish the required shim (10, fig 20) size, e.g. 0,9 mm (0.035 in).

   Shim packs are available in the following sizes: 0,10 mm (0.004 in), 0,15 mm (0.006 in), 0,20 mm (0.008 in), 0,30 mm (0.012 in), 0,50 mm (0.020 in).

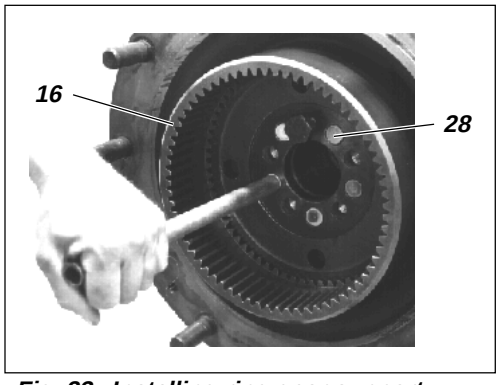


Fig. 23 Installing ring gear support

6. Install ring gear support (13) into ring gear (16) and locking ring (11) into position. Install all of it into wheel hub (7, fig 20).

   Clean the screws (28) from old Loctite with Loctite 7070 ODC Free Cleaner or 1,1,1,trichloroethane (methyl chloroform). Mount the screws (28) with Loctite 270 and with a torque of 220 - 230 Nm (162.3 - 169.6 lbf.ft).

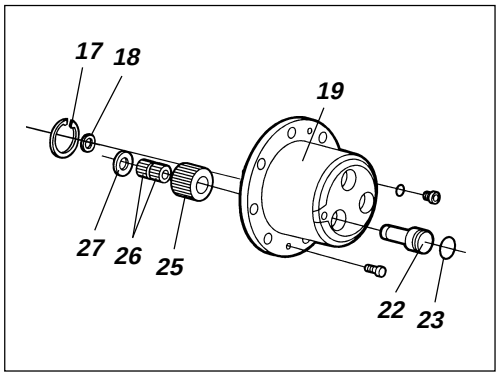


Fig. 24 Planetary gear

7. Insert all 3 planets (25) into planet carrier (19) through the center hole.

8. Mount washer (27) and bearings (26) before you mount the shaft (22) with the o-ring (23).

   Take care to center the washer (27).

   Use of a hydraulic press will simplify the mounting of the 3 shafts (22).

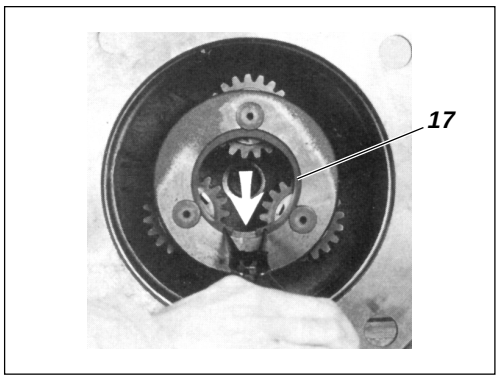


Fig. 25 Planetary gear

9. Chamfer after having mounted the circlip (17) as indicated in fig 25.

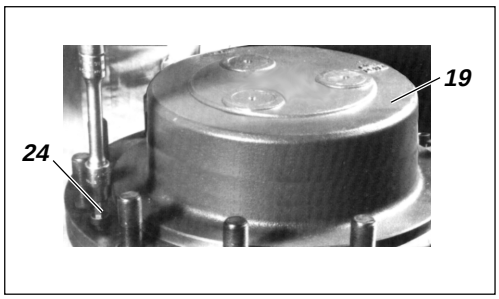


Fig. 26 Mounting planetary carrier onto wheel hub

10. Assemble cover (19) with the complete planetary carrier onto wheel hub.

    Single offset mounting position of screws (24) and tighten them with a torque of 86 - 89 Nm (63.4 - 65.6 lbf.ft).

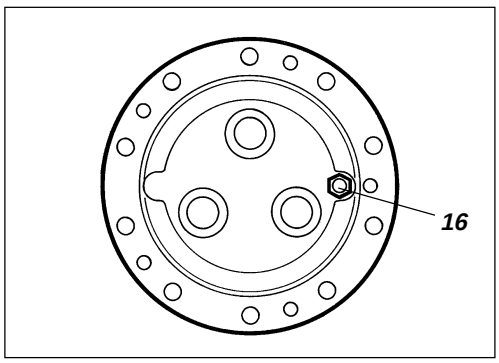


Fig. 27 Planetary gear/filling position
16. Plug

Remove the plug (16) and begin fill oil through the plug-hole until it starts seeping back out again. Refit the plug.

Use transmission oil. See the lubrication specification on page 5.

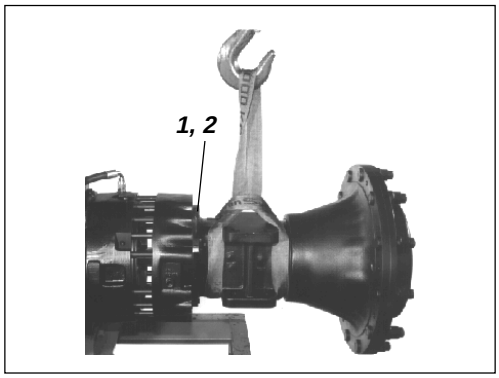


Fig. 28 Axle housing

Drain the oil, see MAINTENANCE MANUAL.

1. Release the brakes by pressurizing the brakes 1.5 to 3.0 MPa (15 to 30 bar), fig 9, by using an external manual pump.

2. Remove the nuts (1) and screws (2).

3. When releasing the hydraulic pressure of the brake, the brake pistong pushes the axle housing away. Continue to extract the axle housing horizontally, fig 28.

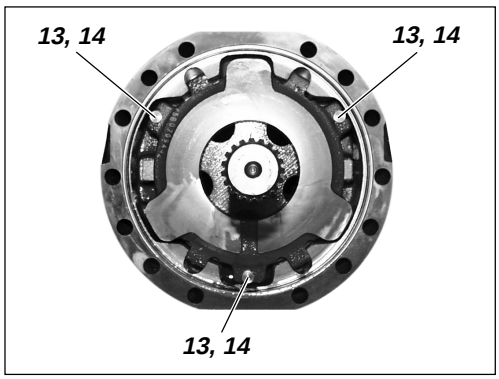


Fig. 29 Bolts and springs

4. Remove screws (13) and springs (14), fig 29 and 30. Mark position of brake disc (24) with a centre-punch, fig 30, to housing and remove it.

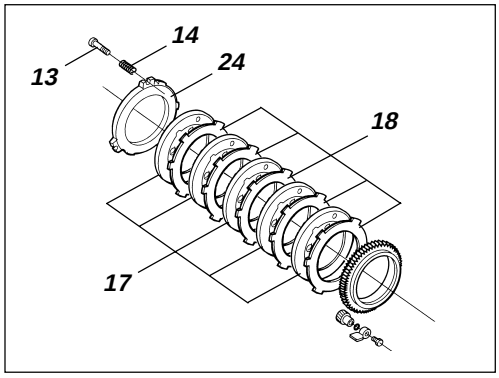


Fig. 30 Brake

5 Remove brake discs (17) and intermediate brake discs (18), fig 30 and 31.

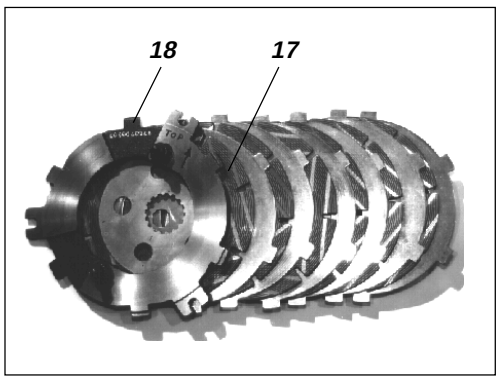


Fig. 31 Brake discs

In order to keep the same braking torque do not change the position of the brake discs and the intermediate brake discs.

Fig. 32 Brake disc

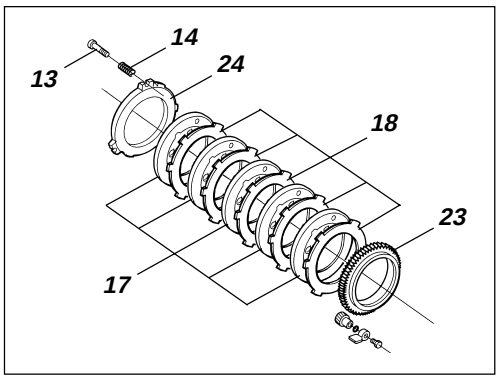


Fig. 33 Brake

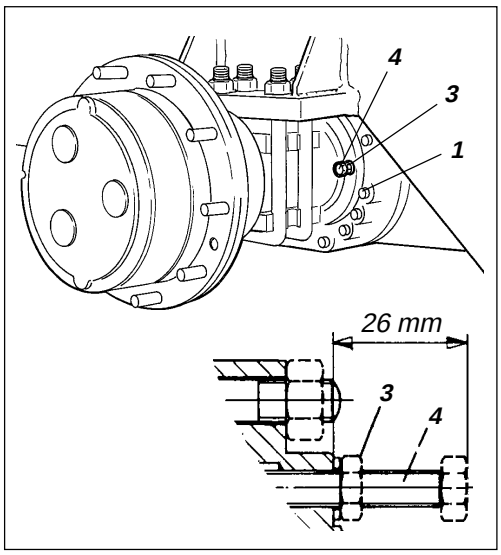


Fig. 34 Manual brake release screw
3. Locknut
4. Adjusting screw

For assembly, reverse the procedure as described in the previous chapter, renewing all seal rings.

1. Install intermediate brake disc (18) to gear wheel (23) and continue with brake disc (17) and then next intermediate brake disc (18) and so on. Brake disc (17) to be fitted with stamped mark visible on the same place so when all discs are fitted, there are holes through all discs to ensure oil circulation. See fig 32 and 33.

2. Then fit springs (14), brake disc (24) and screws (13).

   Mount the screws (13) with a torque of 20 - 30 Nm (14.8 - 22.1 lbf.ft).

   Make sure that the left and right brake discs (24) are not interchanged from left to right side!

   The brake discs can be reused to a minimum thickness of 4,5 mm (0.18 in).

   New disc thickness = 4,9 mm (0.19 in).

3. Pressurize the brakes 1.5 to 3.0 MPa (15 to 30 bar) and mount the axle housing. Fit nuts and bolts, after cleaning, with Loctite 243.

4. Check that the three screws for mechanical brake release are sticking out 26 mm (1.02 in) to set the brake disc gap to 0,75 mm (0.03 in) between the brake discs.

5. Check that the axle mounting flanges are parallel before tightening the nuts (1) with a torque of 120 Nm (88.5 lbf.ft).

Refill unit with oil to correct level, see MAINTENANCE MANUAL.

DIFFERENTIAL - PINION HOUSING, DISASSEMBLY (16423)

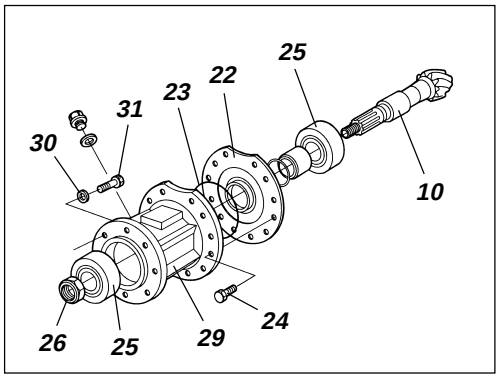


Fig. 35 Pinion housing

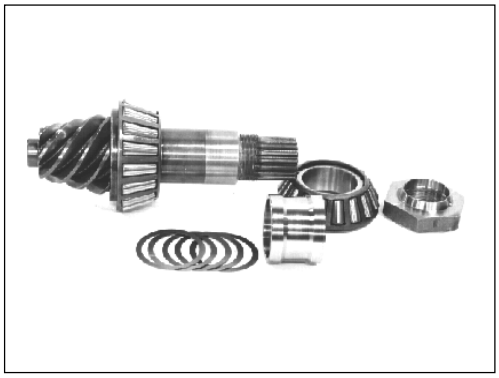


Fig. 36 Pinion parts

Drain the oil from the differential housing, see MAINTENANCE MANUAL.

1. Undo screws (31) and washers (30) and remove the housing.

2. Remove nut (26).
   Use wrench, P/N 12 29 65, and socket, P/N 12 29 66, see fig 85, 86 on page 39 and 40.

3. Undo screws (24) and pull out housing (29).

4. Remove the o-ring (23) and the shims (22).

5. Press out pinion shaft (10) from housing (29).
   To simplify removal of pinion shaft, use holder for pinion housing, P/N 12 29 67 fig 87 on page 41.

5. Remove inner bearings (25) from pinion shaft (10).

6. Remove outer bearing races (25) from housing (29).

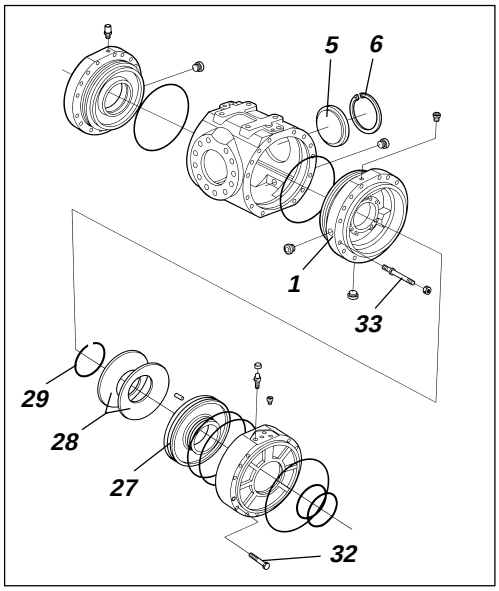


Fig. 37 Differential housing

To remove the crown wheel, make sure you have done the previous chapter PINION HOUSING, DISASSEMBLY completely.

Remove retaining ring (6) and cover (5), fig 37.

Left side of axle

1. Remove left axle housing and then the left brake housing by removing the 2 screws (32). The brake housing consists of the conical springs (28) that are attached to the brake piston (27) with a circlip (29).

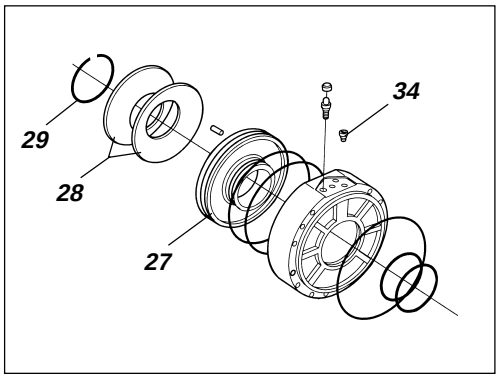


Fig. 38 Ring nut in intermediate housing

2. Remove circlip (29), conical springs (28) and press out the pistong (27). Check all o-rings.

   Also check the ventilator (34) for the brake pistong o-ring failure.

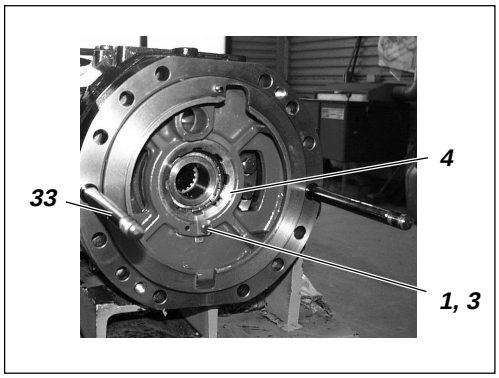


Fig. 39 Ring nut in intermediate housing

3. Remove screw (1), locking plate (3) and undo the ring nut (3).

4. Remove stud bolts (33) with care, and gentle take out the intermediate housing (pos 1, fig 37).

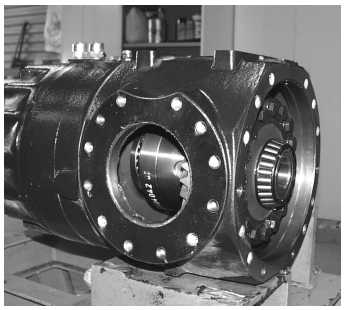


Fig. 39 Differential housing

Differential housing

If there is no need to separate the crown wheel from the differential carrier, just take them out through the left side of the differential housing.
Both axles, P/N 37 15 93 and P/N 37 29 40, have their crown wheel removed in the same way.

There is no need to remove the right side of axle to remove the crown wheel and the differantial carrier.

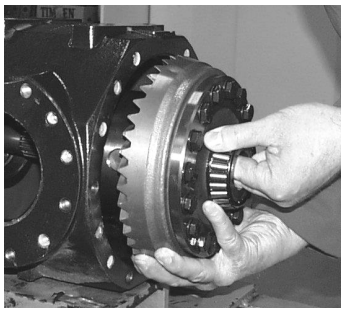


Fig. 40 Crown wheel

The easiest way to remove the crown wheel from the differential carrier is to loosen all the screws while inside the differential housing. Take it out and remove the fitting screws completely.

Replace the fitting screws of the crown wheel every time that they have to be removed.

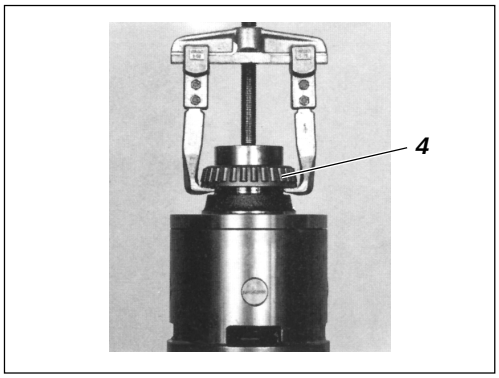


Fig. 42 Differential carrier

AXLE P/N 37 15 93 (LIMITED SLIP)

To remove the differential carrier, make sure you have done the previous chapters PINION HOUSING, DISASSEMBLY and CROWN WHEEL, REMOVAL completely.

If you don't suspect any fault on the crown wheel, there is no need to separate it from the differential carrier

1. Take a spacer that just fits over the hole in the differential carrier and remove the bearing (4) with a two arm puller, fig 42.

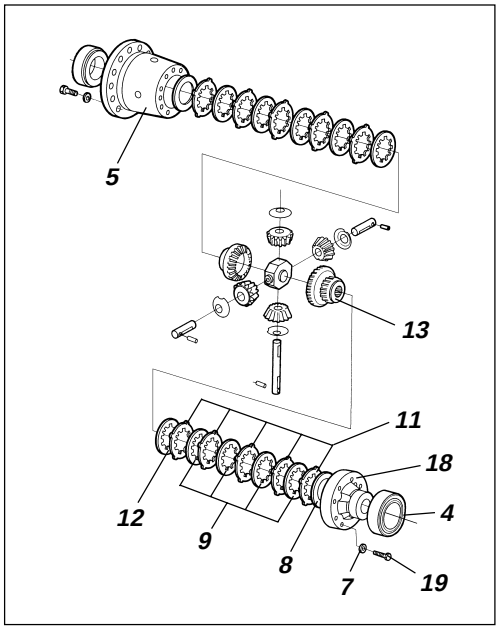


Fig. 43 Differential carrier

2. Mark both parts of the carrier so you can align it when assembled. Undo the screws (19) and remove the differential carrier (18).

3. Take out the limited slip disc kit (37), consisting of different shaped limited slip discs (9, 11, 12), shim (8), and the differential side gear (13). Remember the order they where fit.

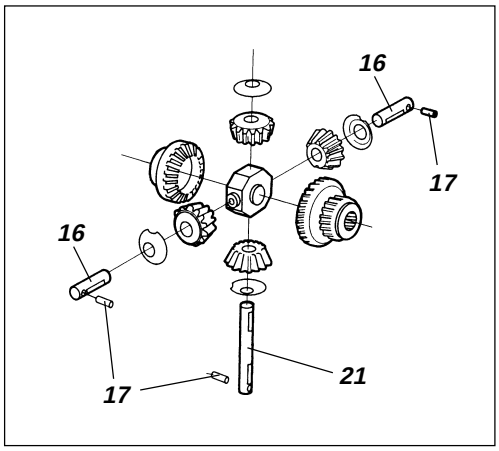


Fig. 44 Differential

4. To remove the shafts (21, 16) you will need to remove the three pins (17) that holds the shafts.

   Begin with removing the long shaft (21) then the smaller ones (16). You can localize the different shafts by checking the holes on top of the carrier. There is a small hole for each pin for every shaft.

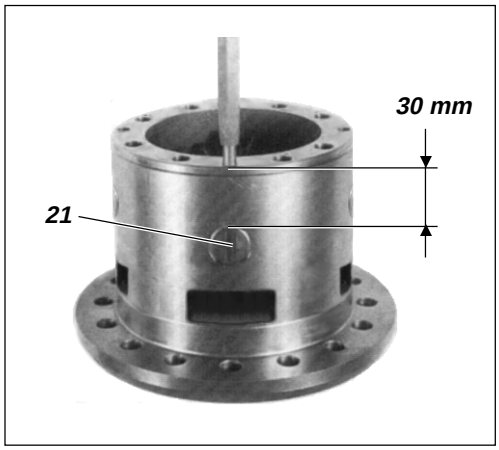


Fig. 45 Removing the shaft pin

5. Insert a mandrel and firmly tap down the pin into the shaft (21), stop when you have tapped down the pin to 30 mm (1.18 in)

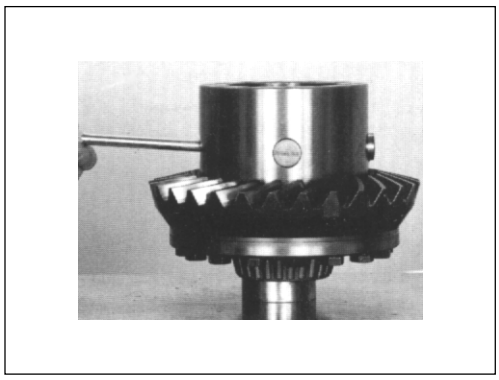


Fig. 46 Removing shaft

6. Remove all three shafts by tapping a hammer on a mandrel on the opposite side.

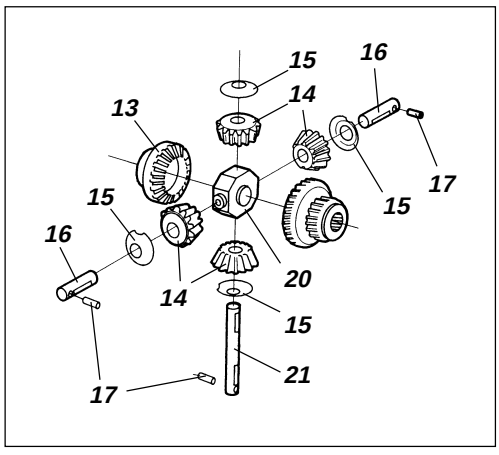


Fig. 47 Differential

6. Take out the shaft retainer (20), differential pinion (14) with friction washer (15).

   Remove the other differential side gear (13) with the limited slip disc kit (37), fig 43.

7. Remove the pins (17) completely from the all the shafts (16, 21).

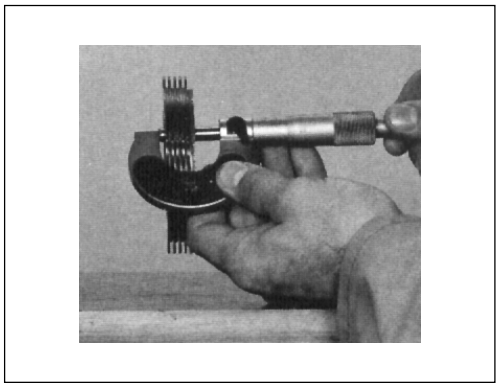


Fig. 48 Measuring disc pack

AXLE P/N 37 15 93 (LIMITED SLIP)

1. Check the disc pack to determine the shim thickness. The total thickness of the disc pack with eventual shims must be 16,2 mm ± 0,1 mm (0.64 in ± 0.004 in). Shim packs are available in the following sizes: 0,10 mm (0.004 in), 0,20 mm (0.008 in), 0,30 mm (0.012 in).

2. Put the limited slip discs with eventual shim (8) and the side gear with slip discs in differential carrier (6).

3. Arrange the limited slip discs (9, 11) on differential side gear (13).

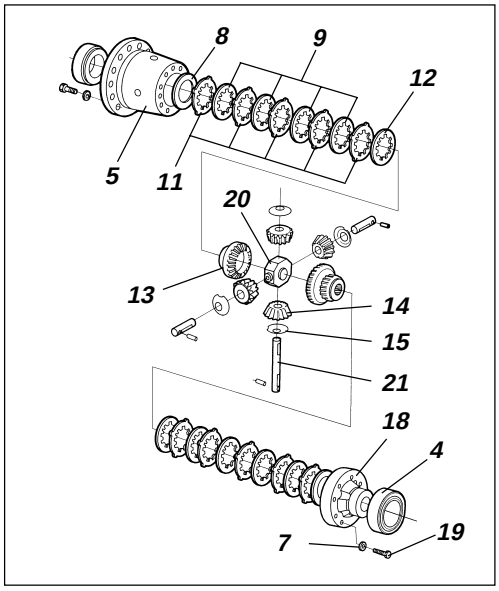


Fig. 49 Differential carrier

4. Insert the shaft (21), tap it in as much as you can fit one of the differential pinion (14) with a friction washer (15) onto the shaft. Tap the shaft a bit further and fit the shaft retainer (20) and the last differential pinion with a friction washer.

5. Tap in the two shorter shafts with their respective differential pinions and friction washers.

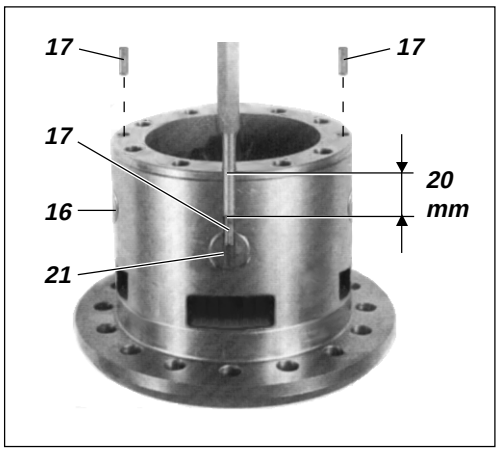


Fig. 50 Inserting the shaft pin

6. Lock the shafts (21, 16) by fitting the three pins (17). Tap the pins down 20 mm (0.79 in).

7. Put the last side gear with slip discs in place.

8. Mount the differential carrier (18) with screws (19) and washers (7), fig 49. Lock the screws with Loctite 270 and a torque of 69 - 72 Nm (50.9 - 53.1 lbf.ft).

9. Fit the bearing (4), on the differential carrier (18).

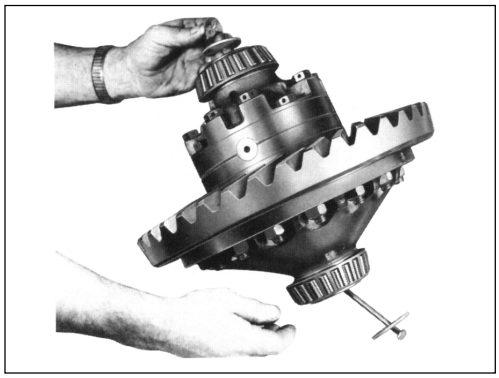


Fig. 51 Inserting the retaining bolt and washer assembly

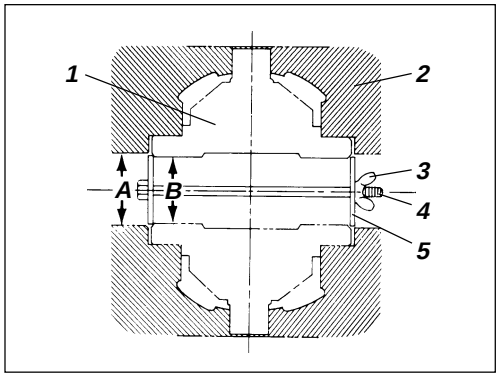


Fig. 52 Retaining bolt
1. NoSPIN differential assembly
2. Gear support case
3. Wing nut
4. Retaining bolt
5. Retaining washer

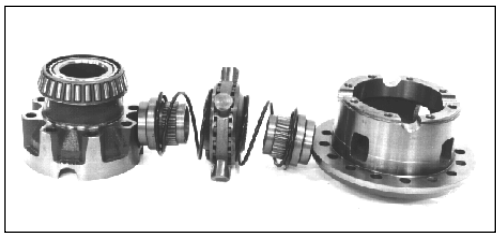


Fig. 53 NoSPIN

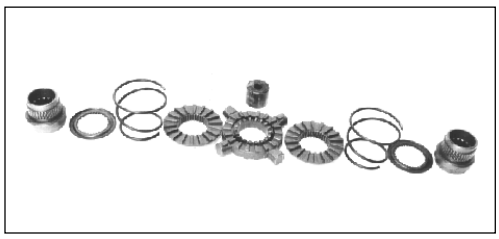


Fig. 54 NoSPIN disassembled

AXLE P/N 37 29 40 (NoSPIN)

To remove the NoSPIN differential, make sure you have done the PINION HOUSING, DISASSEMBLY chapter completely.

1. Mark the differential case halves so they can be reassembled in their original position when repair or inspection is completed.

2. Insert the NoSPIN differential retaining bolt and washer assembly. Thread the nut finger tight against the washer, fig 51. You will note that the retaining washers must be small enough to pass through the case ends (dimension A, fig 52), yet large enough to restrain the two side gears (dimension B, fig 52) and the balance of the differential assembly when all parts are assembled and the springs are compressed.

   If a retaining and washer assembly are not available, **hold the differential case firmly as the last bolts are being removed from the case halves to absorb spring pressure and prevent possible injury.**

WARNING

Failure to use a retaining bolt or some other restraining means when seperating the differential case halves can cause injury in that NoSPIN differential have compressed springs.

3. Remove crown wheel and bolts.

4. Undo screws and clean them from old Loctite, seperate the case halves and remove the NoSPIN differential assembly.

5. Release the retaining bolt and washer assembly while firmly holding the NoSPIN differential to absorb spring pressure.

6. Remove side gears, springs, spring retainers, driven clutch assemblies and spider assembly.

For inspection of components refer to NoSPIN OWNER'S MANUAL.

Fig. 55 Spring and retainer mounted on side gear

AXLE P/N 37 29 40 (NoSPIN)

1. Lubricate all friction surfaces.

2. Assemble a spring retainer over the side gear splines with the retaining with the retaining lip pointed up. It should seat against the side gear shoulder. Place a spring over the side gear spline and against the retainer lip with the smaller diameter of the spring against the retainer, fig 55.

   Verify that the spring is functioning freely. Be sure the spring is not binding, that the coils do not overlap and that there is good contact between the coil and the spring retainer.

3. Assemble the two clutch assemblies to the spider assembly.

   Be sure the 'slot' in each holdout ring is properly aligned over the long tooth of the spider assembly.

4. Position the spider assembly and clutch assembly on top of spring. Assemble the other side in the same manner as item 2 to 4.

5. Use a mechanical press (or other safe means) to compress the springs and fasten the NoSPIN together with a retaining bolt, washers and a wing nut, fig 56. Be sure the side gear splines are completely meshed with the clutch spline.

WARNING

Failure to use a retaining bolt or some other restraining means when seperating the differential case halves can cause injury in that NoSPIN differential have compressed springs.

Fig. 56 Using a mechanical press to compress the springs

6. Lay the ring gear and flanged half of the differential case on a bench with the bearing end of the case hub down and the inner case facing up. **Ensure no thrust washers are inside the case.**

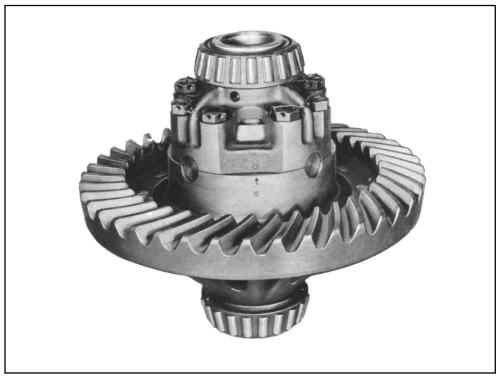


Fig. 57 NoSPIN differential with crown wheel mounted

7. Install the NoSPIN differential in the flanged differential case half and mount the plain case half over the side gear. **Ensure no thrust washers are inside the case.**

8. Position the case halves firmly together with the punch marks aligned, install the case bolts and lock them with Loctite 270 and a torque of 135 - 138 Nm (99.6 - 101.8 lbf.ft). Ensure a tight fit between the two case halves.

9. Remove the wing nut, washers and retainer bolt, install the crown wheel and lock the bolts with Loctite 270 and a torque of 73 Nm (53.8 lbf.ft).

Before operating the vehicle, perform installation and operation test and refer to NoSPIN OWNER'S MANUAL to ensure correct assembly.

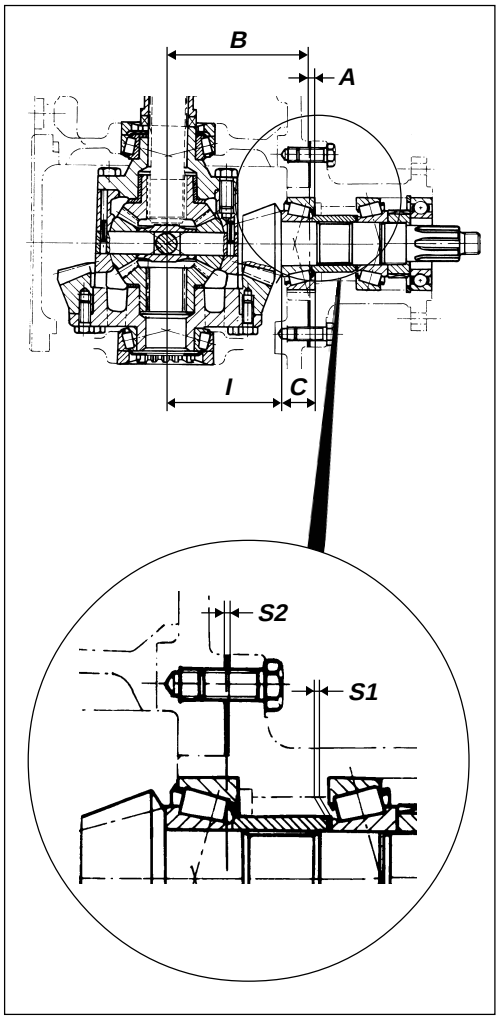


Fig. 58 Differential housing

Assemblage of the pinion can be considered in four parts:

1. Height of pinion
2. Pre-loading of pinion bearing
3. Pre-loading of differential bearing
4. Gear flank play

1. Height of pinion

Measure the size of the intermediate spacer **S2** using the following formula:
S2 = (B + A) - (I + C)

See fig 58.

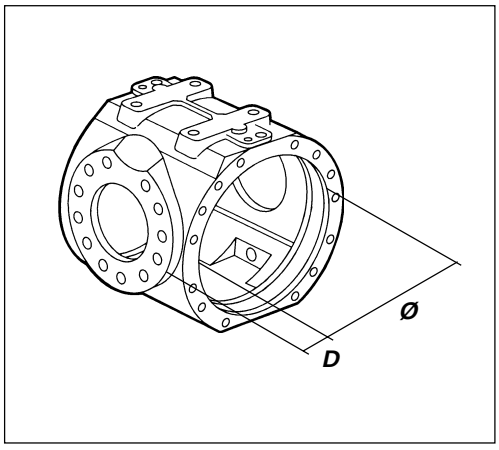


Fig. 59 Differential housing

B = Diameter of centre housing divided by two plus material thickness D.

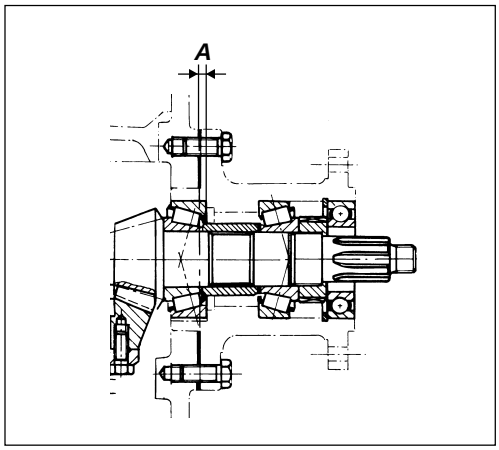


Fig. 60 Differential housing

A = Distance from block level of pinion housing and bottom face of bearing.

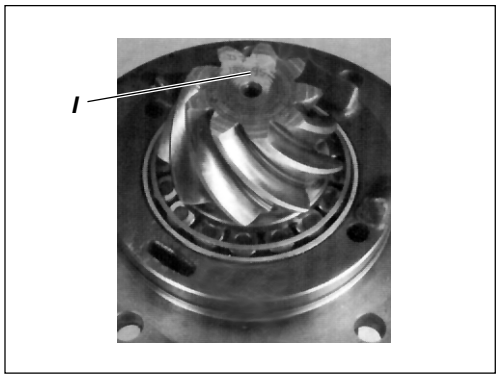


Fig. 61 Pinion spindle

I = This value is punched into the head of the pinion spindle, for example: 117 mm (-0,1), 4.6 in.

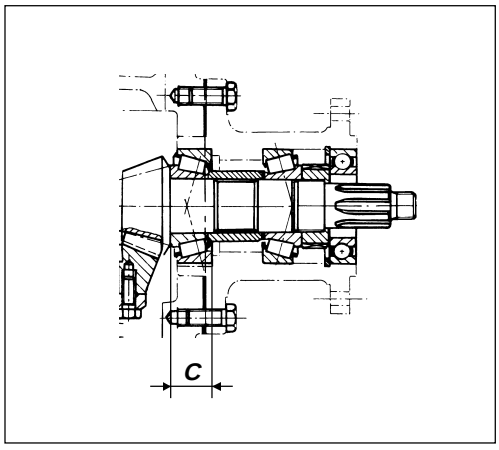


Fig. 62 Width of bearing

C = Width of bearing.

The old intermediate spacer can be used if the pinion housing is not changed. Just adjust the spacer to compensate for any difference in the I value, fig 61, of the new pinion.

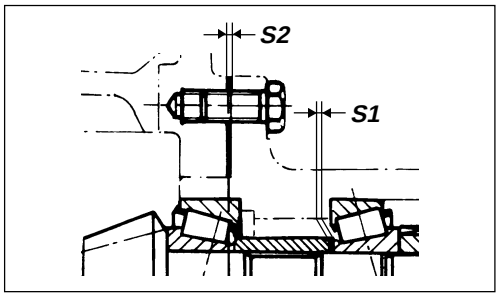


Fig. 63 Differential housing

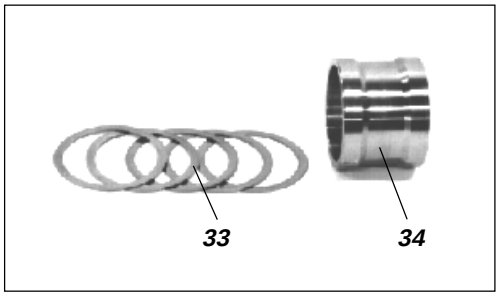


Fig. 64 Pinion spacer and shim
23. Spacer
24. Shim 0,10 mm, 0,15 mm, 0,20 mm, 0,40 mm, 050 mm

2. Pre-loading of pinion bearing

Fit the measured spacers S2 into the pinion housing as shown in fig 63 and fit both outer bearing rings.

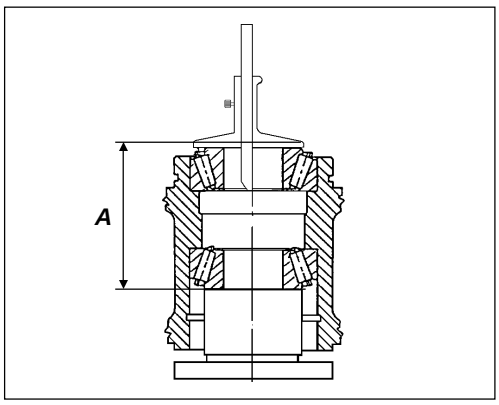


Fig. 65 Measuring the A distance

Measure the size of the intermediate spacer **S1** using the following formula:
S1 = A - B

See fig 65 and 66.

Fit the bearings without spacer ring. Place the pinion housing on a flat-ground surface and measure the distance A.

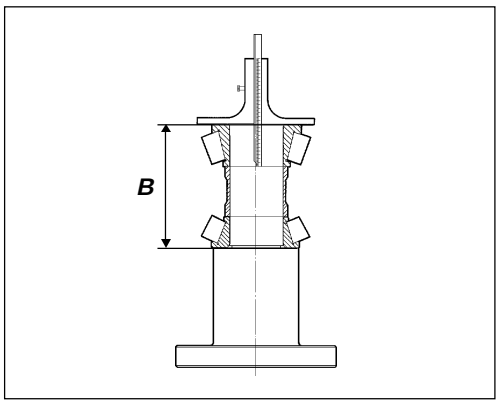


Fig. 66 Measuring the B distance

Lift out the bearings. Then assemble these together with the spacer ring and measure the distance B.

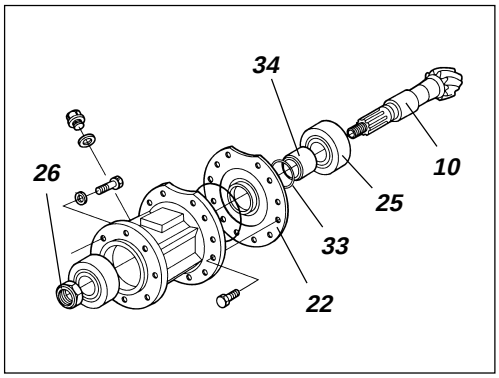


Fig. 67 Pinion housing

Mount the pinion spindle (10) with bearing (25), spacer ring (33) and the measured spacers S1 (33) and S2 (22).

Tighten the pinion nut (26) with a torque of 900 - 1000 Nm (663.8 - 737.6 lbf.ft).

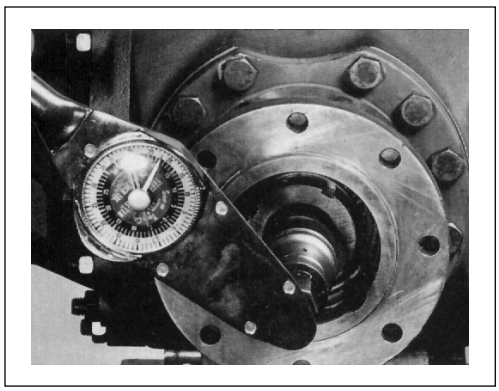


Fig. 68 Tightening pinion nut

Use wrench 12 29 65 and socket 12 29 66, see page 39 and 40. Then measure the pre-loading of the bearing which should be 1,2 - 1,5 Nm (0.89 - 1.11 lbf.ft), see fig 68.

The thickness of the spacers must be adjusted if the bearing load is not within the values recommended above. Then seal the pinion nut (26) with Loctite 243.

3. Pre-loading of differential bearing

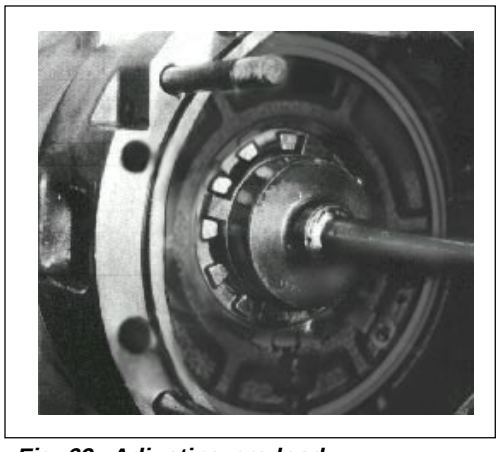


Fig. 69 Adjusting pre-load

Mount the differential housing complete with bevel gear wheel and bearing and both brake housings.

Apply a mild sealant, type Loctite 222, to the ring nuts and adjust the pre-loading of the bearings with the aid of tool 12 29 64, see fig 84 on page 38.

Ensure at the same time that there is an acceptable gear flank play (0.18 - 0.25 mm).

The correct pre-load of the bearings is that measured under item 2 ”Pre-loading of pinion bearing”, plus 0,3 - 0,4 Nm (0.22 - 0.30 lbf.ft).

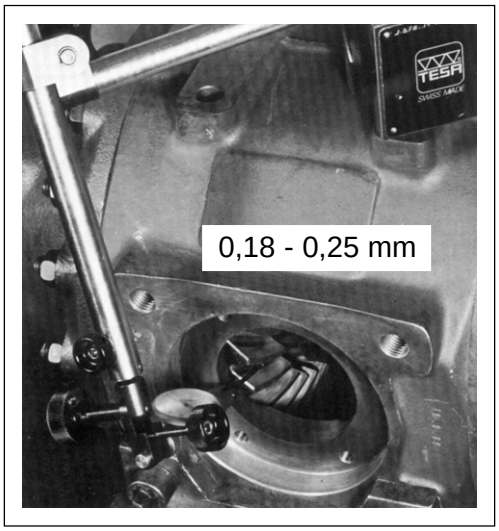


Fig. 70 Adjusting gear flank play

4. Gear flank play

When the correct pre-load is set, adjust both ring nuts equally until the gear flank play is 0,18 - 0,25 mm (0.007 - 0.010 in). Then secure the ring nuts with locking plates.

No further adjustment will be required to give the right gear pattern if the height of the pinion and the gear flank play are correctly set.

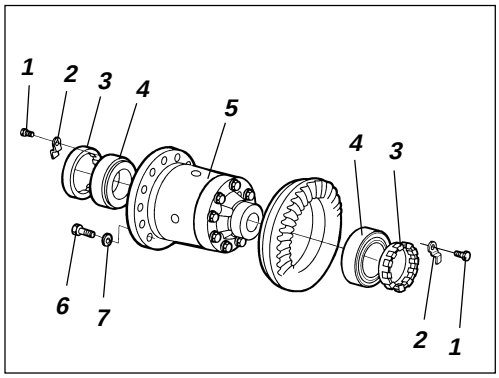


Fig. 71 Assembly the differential

1. Fit bearing carrier (5) onto differential assembly and outer races into the brake housings.

   Install ring nuts (4, fig 71) in right and left intermediate housings (1, fig 73).

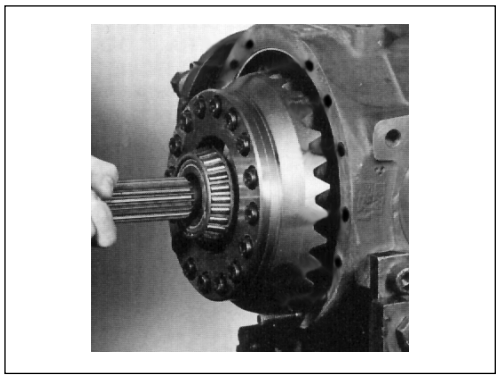


Fig. 72 Assembly the differential

2. Clean the screws (6, fig 71) from old Loctite. Mount crown wheel with screws (6) and washer (7) with Loctite 270 and with a torque of 73 Nm (53.8 lbf.ft).

3. Insert the differential carrier unit with the mounted crown wheel into differential housing (10).

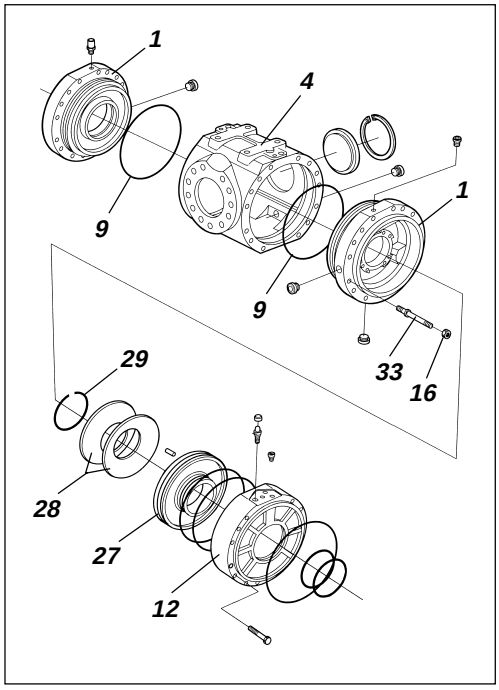


Fig. 73 Differential housing

4. Install new o-rings (9) onto right and left intermediate housings (1), taking care to have cleaned the o-ring grooves.

5. Fit the intermediate housings (1) onto the differential housing (4) carefully entering the bearings.
   Lock intermediate housings with stud bolts (33).

6. Turn in ring nuts (4, fig 71) without preloading the bearings until a minimum backlash is obtained between the teeth of the bevel gear wheel and pinion shaft: Backlash allowed = 0,18 - 0,25 mm (0.007 - 0.010 in) for axle P/N 37 15 93 and 37 29 40, see also chapter CONTACT PATTERN page 43.

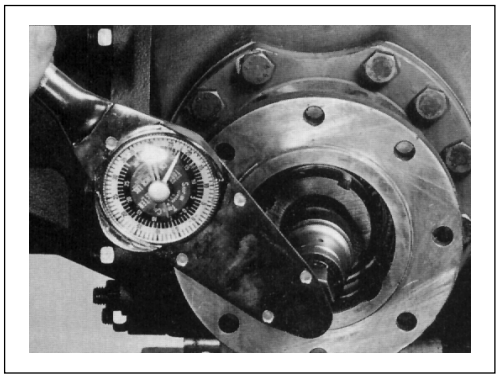


Fig. 74 Checking torque

7. Check the torque necessary to rotate the differential with no load on bearings.
   For example: 1.6 Nm (1.18 lbf.ft).

8. Tighten ring nut on opposite side of bevel gear wheel, preloading the bearings until a torque of 3 - 4 Nm (2.21 - 2.95 lbf.ft) to rotate the differential is obtained.
   Seat the bearings by rotating them fully clock- and counterclockwise. Then check the torque again.
   For example: 1.9 to 2.0 Nm (1.40 - 1.48 lbf.ft).

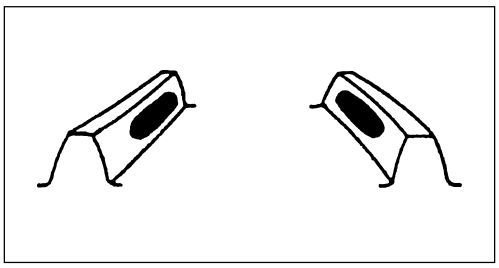


Fig. 75 Correct contact pattern

9. Check tooth contact pattern of gear set, fig 75. See also chapter CONTACT PATTERN on page 43. Apply marking compound to some teeth of bevel gear wheel.

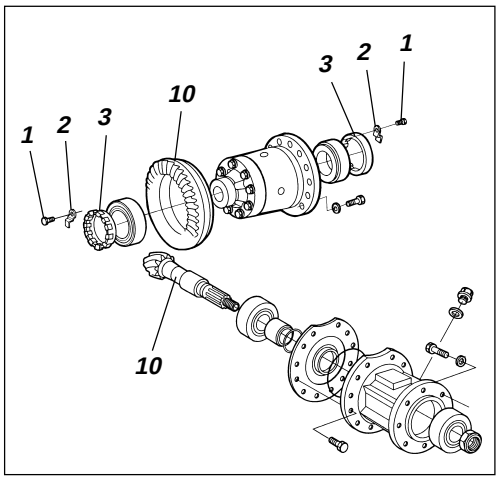


Fig. 76 Differential

10. Rotate the gear set clock- and counterclockwise so that tooth contact pattern is obtained on both surfaces of the gear teeth.

a) Move the crown wheel (10) towards or from the pinion shaft (10) by turning the ring nuts (3).

b) Move the pinion shaft axially by adding or removing shims between pinion housing and axle housing.

11. Check the backlash of the bevel gear set again. To adjust the backlash: Turn ring nuts only, i.e. turn the nut on bevel gear wheel side and tighten the opposite side for equal measure if backlash is too small; visa versa if backlash is too large.

12. With correct backlash, lock ring nuts (3) with locking plates (2) onto optimal position using screws (1).

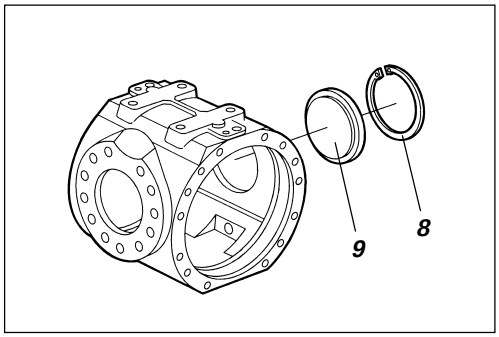


Fig. 77 Differential housing

13. Fit cover (9), fig 77, on the axle housing using retaining ring (8).

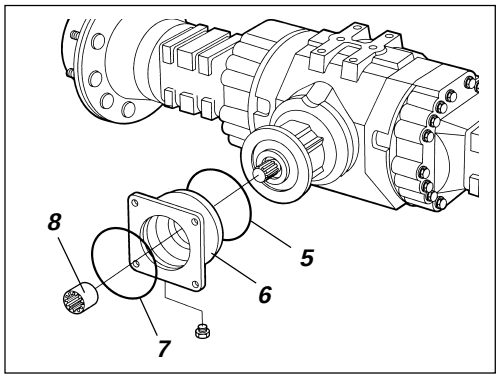


Fig. 78 Connection to the hydraulic motor

When recieving a new wheel axle from Svedala Spare Parts it must be drained from all existing oil, see MAINTENANCE MANUAL.

Put the axle in an axle stand. Dynapac have a special axle stand P/N 12 21 91, see page 37.

1. Applies only to a new axle: Remove the protection cover, which is mounted on the flange (6) and take out the splined sleeve (8).
2. Grease the hydraulic motor axle and mount the splined sleeve (8) on the axle.
3. Make sure the o-ring (7) is in place and mount the hydraulic motor with the splined sleeve (8) on the pinion spindle.

Mount the parts together with care for the splines.

Mounting hydraulic motor

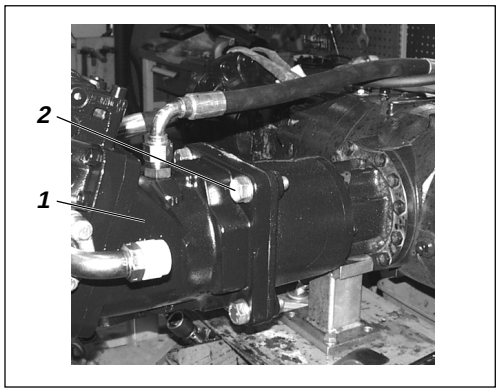


Fig. 79 Hydraulic motor mounted on axle
1. Hydraulic motor
2. Screws, 4x

6. Oil the screws (2, fig 79), mount and tighten them with a torque of 270 Nm (199.2 lbf.ft). Tighten the screws (2) in a diagonal pattern, i.e. upper right then lower left etc.
7. Oil the hydraulic nipples and mount them on the axle.
8. Clean and mount the planetary gear oil plugs, magnetic plug and fill the differential housing with oil, 6 liter, according to specifications on page 5.

Dont forget to remove the lifting plate, P/N 12 24 37, if you have one installed.

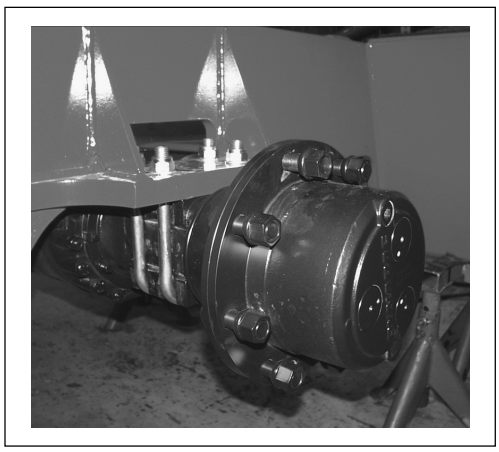


Fig. 80 Mounting the screws

9. Place the axle on a hydraulic jack or lift of sufficient capacity and jack up the axle enough to mount the screws in the tractor frame.
10. Tighten screws with a torque of 330 Nm (243.4 lbf.ft). Begin with the two innermost screws, fig 80, on one side. Continue with the innermost screws on the other side and then the other screws on one side at a time.
11. Connect all hydraulic hoses with the nipples on the axle.

Check/retighten the connections on the machine.

Continue with the next chapter on page 35.

Hydraulic tank - Fill up

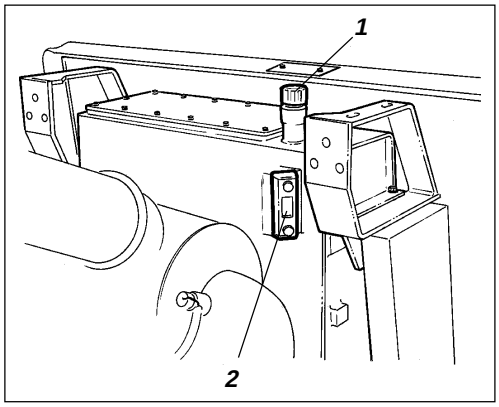


Fig. 81 Hydraulic fluid tank
1. Filler pipe
2. Sight glass

1. Fill up with fresh hydraulic fluid through the filler pipe (2) as per the lubricant specification on page 5. Replace the hydraulic fluid filters at the same time, see MAINTENANCE MANUAL.

2. Start the diesel engine and let it run on idle for a couple of minutes. Check and operate the various hydraulic functions.

WARNING **Make sure there is adequate ventilation (extraction) if the diesel engine is run indoors. (Risk of carbon monoxide poisoning).**

3. Check the fluid level and top up if necessary.

WARNING **Never work under the roller with engine running. Block the drum and wheels if necessary.**

Releasing the articulated joint

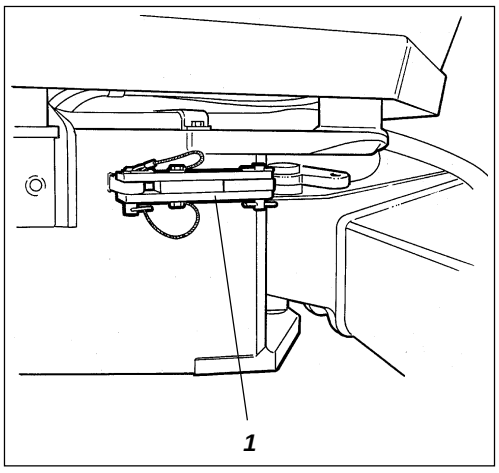


Fig. 82 Right side of articulation
1. Articulation in open mode

Remember to restore the articulation interlock to its open mode before driving again.

4. Release the articulated joint, fig 82.

After the **first** 50 operating hours, change the transmission oil in the axle.

METRIC/U.S. CONVERSION TABLE

To convert from	into	Multiply by	To convert from	into	Multiply by
Bar	Pounds/sq in	14,504	Liters	Qts (US)	1,057
Celsius (°C)	Fahrenheit	(°C x 9/5) + 32	Meters	Inches	39,37
Centimeters	Inches	0,3937	Milimeters	inches	0,03937
Cubic centimeters	cu inches	0,06102	Newton meters (Nm)	Pound-inches	8,8507
Cubic inches	cu centimeters	16,3872	Newton meters (Nm)	Pound-feet	0,7376
Cubic meters	cu feet	35,31	Pounds	Kilograms	0,4536
Fahrenheit (°F)	Celsius	(°F - 32) x 5/9	Pound-feet	Newton meters (Nm)	1,3556
Gallons (US)	Liters	3,785	Pound-inches	Newton meters (Nm)	0,1130
Gallons/min	Liters/sec	0,063	Pounds/in	Kilograms/cm	0,1786
Inches	Centimeters	2,54	quarts (liq)	Liters	0,9463
Inches	Millimeters	25,4	Sq cm	sq inches	0,155
Kilograms	Pounds	2,205	Sq inches	sq cms	6,452
Kilograms/cm	lbs/in	5,60	Sq meters	sq feet	10,76
Kilometers	Miles	0,6214	Sq milimeters	sq inches	0,00155
Kilometers/hr	Miles/hr	0,6214	Temp (°F) - 32	Celcius (°C)	5/9
Liters	Gal (US)	0,264	Tons (metric)	Pounds	2205,0

TORQUE TABLE

Tightening torque

Tightening torque in Nm (lbf.ft) for oiled bolts when using a torque wrench.
Use SHELL ONDINA 32 oil alt. SHELL RETINAX 15.

M thread	STRENGTH CATEGORY	
	8.8 (Grade 5)	10.9 (Grade 8)
M4 X 0,7	2,5 (1.8)	3,4 (2.5)
M5 X 0,8	4,9 (3.6)	7,0 (5.2)
M6 X 1	8,4 (6.2)	12 (8.9)
M8 X 1,25	21 (15.5)	28 (20.7)
M10 X 1,5	40 (29.5)	56 (41.3)
M12 X 1,75	70 (51.6)	98 (72.3)
M16 X 2	169 (124.7)	240 (177)
M20 X 2,5	330 (243.4)	470 (346.7)
M24 X 3	570 (420.4)	800 (590.1)
M30 X 3,5	1130 (833.5)	1580 (1165.4)
M36 X 4	1960 (1445.7)	2800 (2065.3)

SPECIAL TOOLS

In order to simplify a repair it is recommended to have some special tools. We will therefore upon request supply drawings so you can make them yourself.

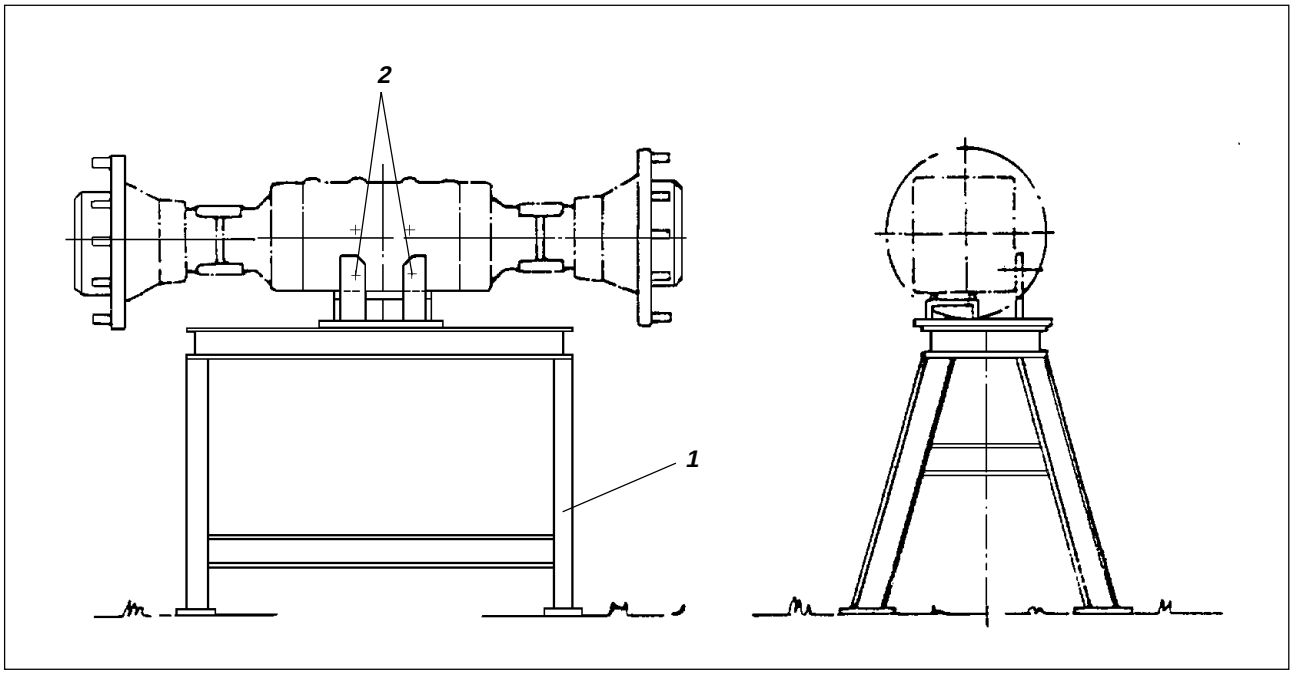


Fig. 83 Axle stand with mounted complete axle

Dynapac P/N	Description	Qty	Remarks
12 21 91	Axle stand for complete axle. Pos. 1 in fig 83 above.	1	Drawings Necessary
50 00 93	Screw M 16 x 40. Pos. 2 in fig 83 above.	2	Necessary
12 29 64	Wrench and socket for bearing ring nut in differential housing, fig 84.	1	Recommended
12 29 65	Wrench for pinion nut, fig 85.	1	Necessary
12 29 66	Socket for pinion nut, fig 86.	1	Necessary
12 29 67	Holder for pinion housing, fig 87.	1	Helpful
90 08 46	Tool kit for brake adjustment, fig 88.	1	Helpful

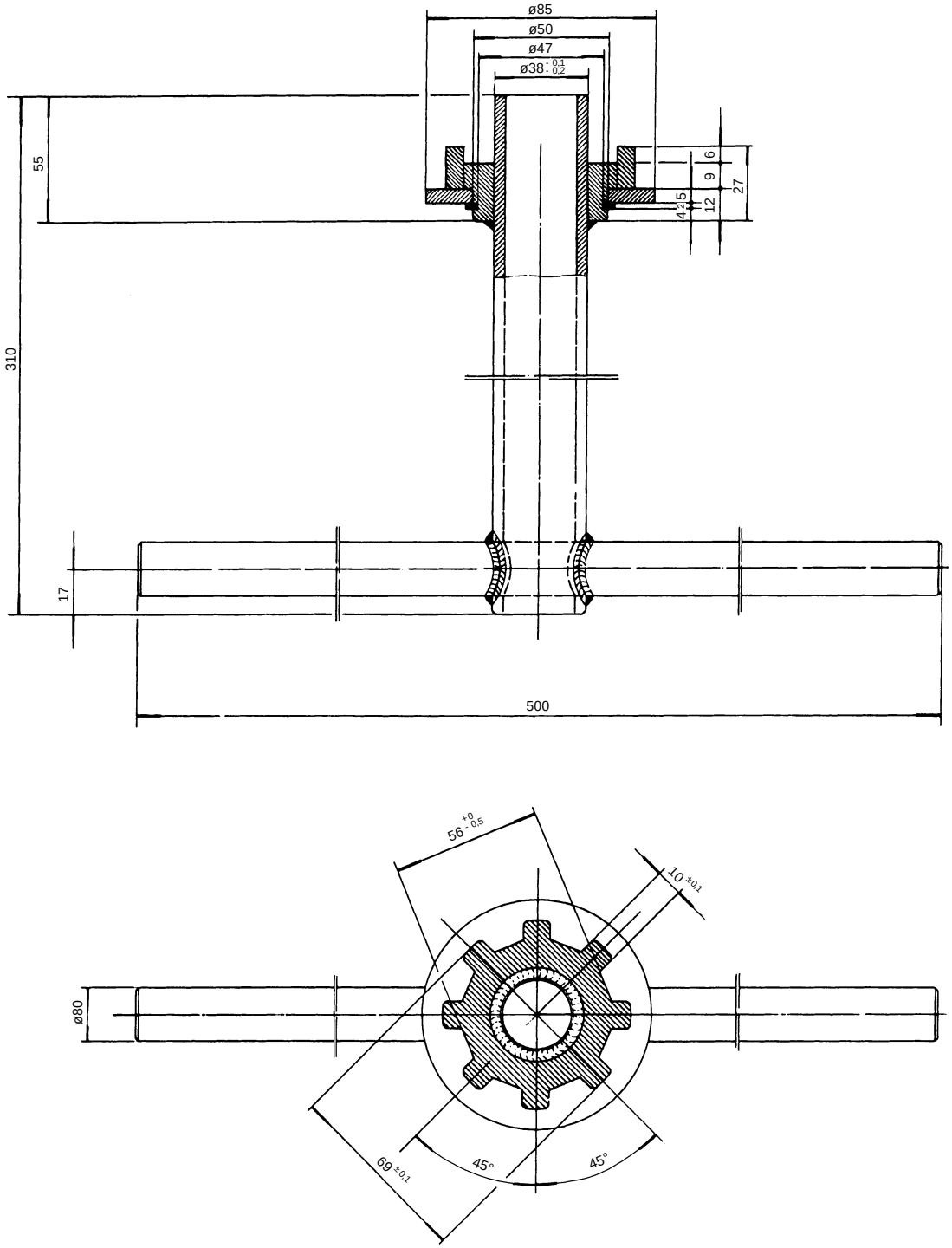


Fig. 84 Wrench and socket for bearing ring nut, tool kit P/N 12 29 64

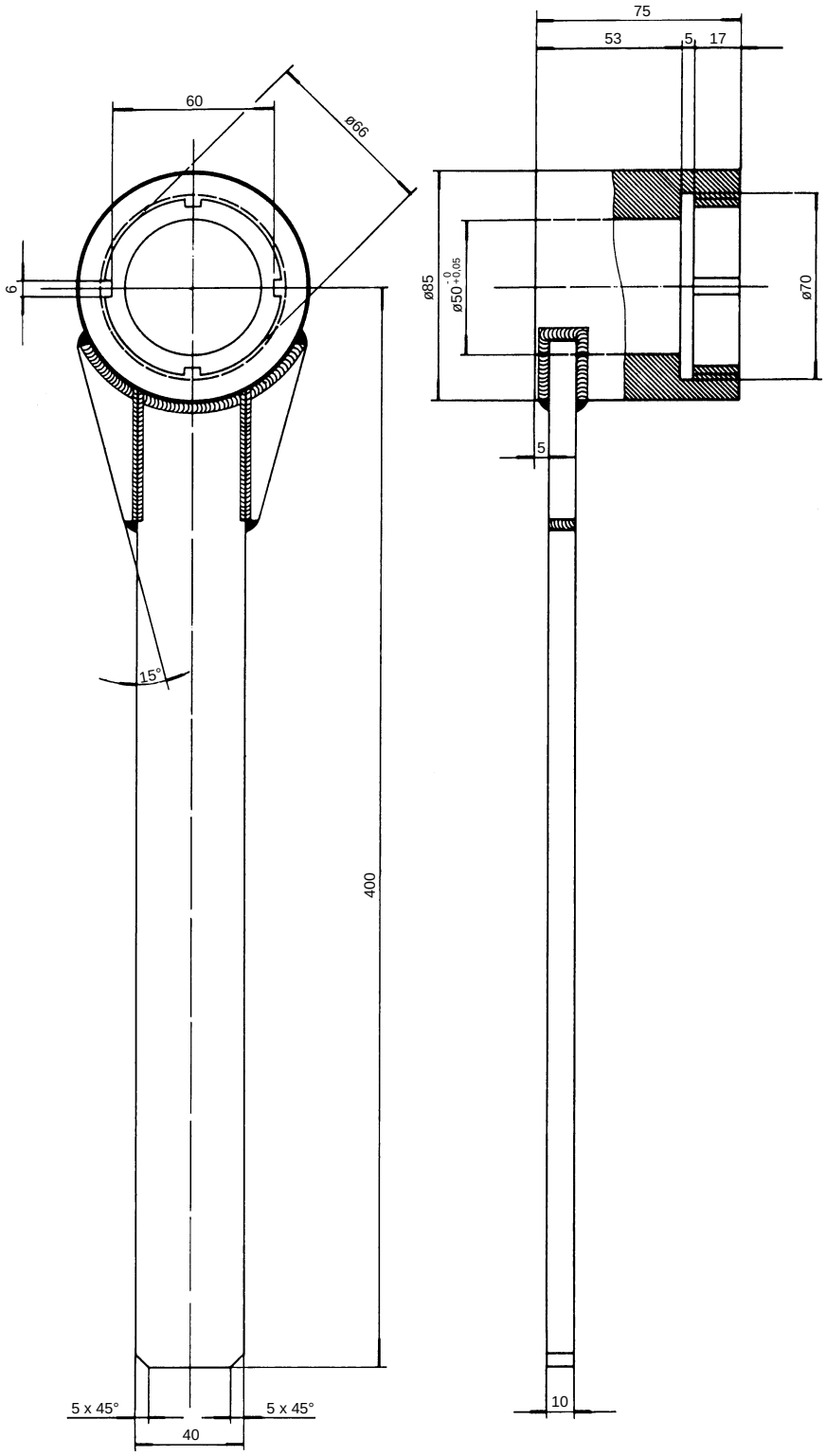


Fig. 85 Wrench for pinion ring nut, tool kit P/N 12 29 65

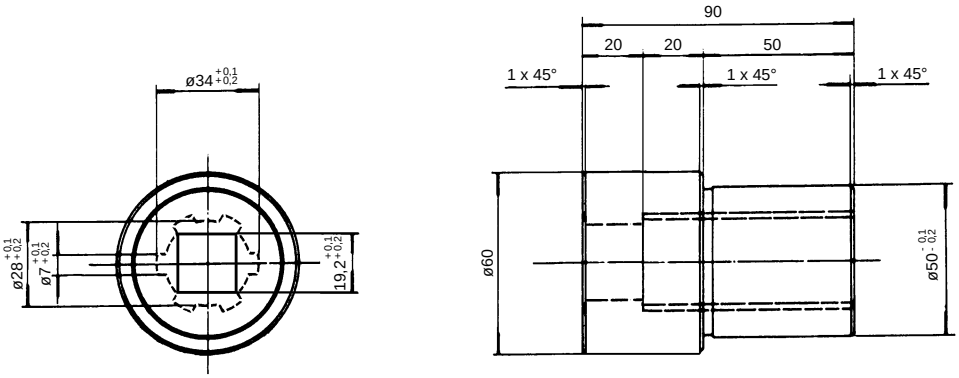


Fig. 86 Socket for bearing ring nut, tool kit P/N 12 29 66

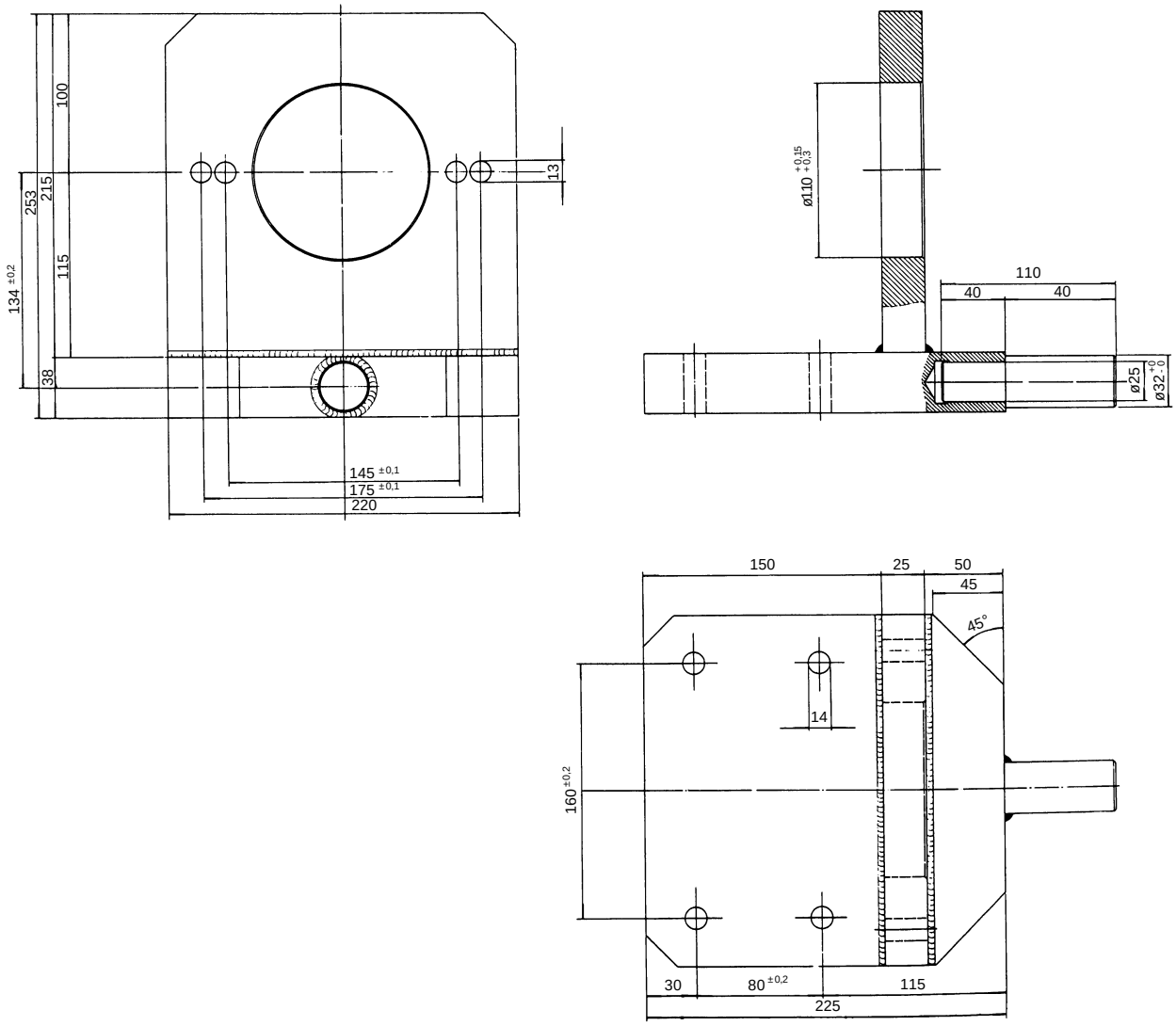


Fig. 87 Holder for pinion housing, tool kit P/N 12 29 67

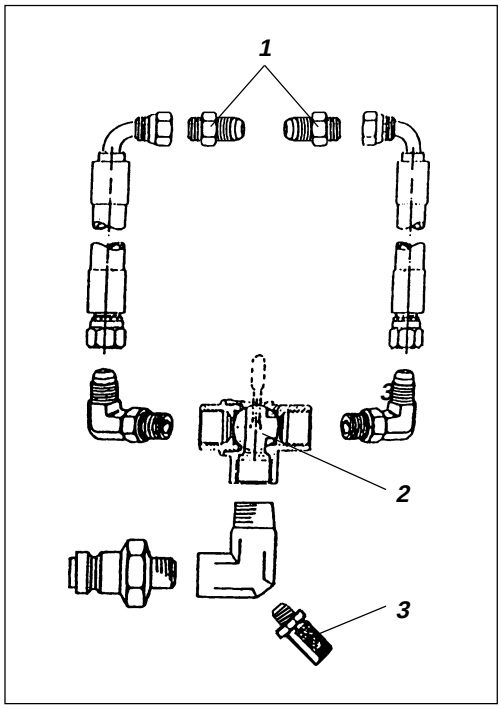


Fig. 88 Tool kit P/N 90 08 46 for brake adjustment

1. Adapters for use with a new axle P/N 90 05 52
2. 3-way valve
3. Test nipple

This tool kit is helpful to make brake adjustment work easier. (Only parts in fig 88 are included in the kit, except from the adapters P/N 90 05 52).

It can be used on all rear axles with P/N: 37 15 93 and 37 29 40.

Connect a 60-bar pressure gauge to test nipple (3) to keep control on not exceeding the maximum brake release pressure (30 bar).
With this device, one side at a time can be pressurized (brake released) in order to allow brake torque check on the other side by using a torque wrench and the socket for the pinion P/N 12 29 66 (fig. 86) or make a splined sleeve with a 3/4 square drive to match the wrench.
Smaller adjustments may be performed by using the external square headed adjusting screw under the locking tab above the manual brake release screw (see fig 8) on each side. Total min brake disc play 0,75 mm (0.03 in) must be obtained.
The hydraulic motor has to be removed to perform this check. Select side with the 3-way valve (3).

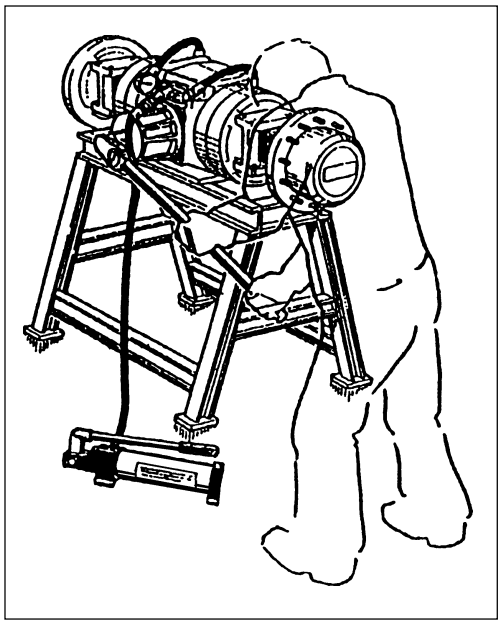
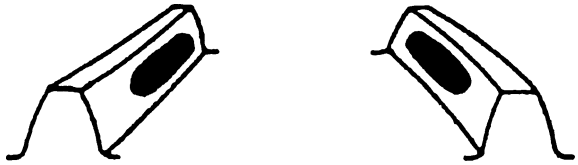
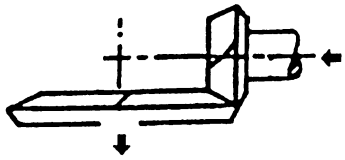
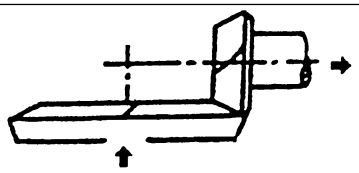
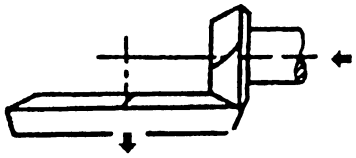
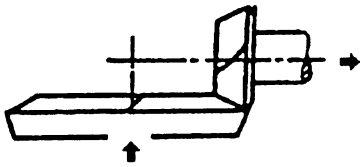
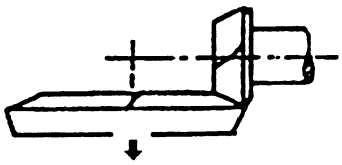
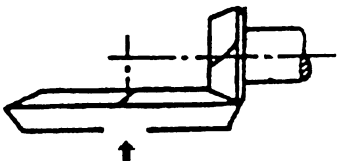


Fig. 89 Checking the torque

Minimum allowed torque per each side:

Axle type, P/N	New and reconditioned axles
37 15 93	800 Nm (80 kpm)
37 29 40	800 Nm (80 kpm)

CONTACT PATTERN

	**Correct contact pattern**
Incorrect contact pattern	**Move thus to obtain correct contact pattern**
1.	
2.	
3.	
4.	
5.	
6.	
7.	**Do not use bevel gear sets with such incorrect contact patterns**
8.	**Do not use bevel gear sets with such incorrect contact patterns**

TROUBLE SHOOTING

Trouble	Possible cause	Correction
Insufficient braking	1. Incorrect adjustment	Inspect disc thickness, see page 8, and if discs are usable readjust brakes to the specifications on page 9.
	2. Brake discs worn out	Inspect disc thickness, see page 8, and replace if necessary, see page 16-17.
Overheating	3. Oil level wrong	Drain, flush and refill to proper level.
	4. Too small of a brake gap	Readjust brakes to the specifications in the vehicle's service manual
	5. Park brake dragging	Unlock the brake and adjust the correct gap.
	6. Air in brake circuit	Open the bleeders for a second, see pos 10-11 on page 52.
	7. Restriction in return line of brake Servo system	Inspect for and replace damaged return line. Inspect for and remove any filter, tee'd in line or any other source of back pressure from the return line.
	8. Incorrect lubricant	Change the retaining rings of the brake circuit and brake pump.
Diff-lock inoperative	9. Loose or misadjusted linkage	Inspect and correct linkage and readjust as indicated in vehicle's service manual.
	10. Worn discs in limited slip	Replace discs as described on page 16.
Oil coming out of breather	11. Leak in internal brake system	Replace the four o-rings on the brake piston, see page 19.
NoSPIN indexing noise when driving straight	12. Unequal tire pressure left and right	Inflate tires to the recommended pressure in the service manual, or until the rolling radius is equal.
	13. Different style, size or brand of tires between left and right hand side.	Change tires to make the radius equal. Vary tire pressure within the specifications until the rolling radius is equal.

Trouble	Possible cause	Correction
Noise during coast and under power the same	14. Wheel bearings damaged	Replace and adjust as described on page 12 - 15.
Noise under power greater than during coast	15. Low oil level	Refill oil to proper level.
	16. Incorrect lubricant	See correction no. 8.
	17. Ring and pinion worn	Inspect through rear cover. Replace and adjust as described on page 18 and from 27 to 31.
	18. Worn ring and pinion bearings	Replace and adjust as described on page 18 and from 27 to 31.
	19. Worn planetary gears or bearings	Replace as described from page 12 to 15.
Noise during coast greater than under power	20. Loose pinion nut	Inspect ring, pinion and pinion bearings. If undamaged, retighten nut as described from page 32 to 33.
	21. Only one pinion bearing damaged	See correction no. 18.
Noise during turn (without NoSPIN)	22. Worn spider and/or side gears	Replace as described from page 21 to 23 or 24 to 26 dependent on axle type.
A ”Stick slip” noise when going from forward to reverse	23. Loose wheel	Inspect for wheel and wheel stud damage. Replace if needed and retorque lugnuts.
	24. Shaft pins loose in differential carrier	Inspect through rear cover. Replace as described from page 21 to 23 or 24 to 26 dependent on axle type.
	25. Damaged or missing spider and/or side gear washers	See correction no. 22.

EXPLODED VIEW 16422 - REAR AXLE

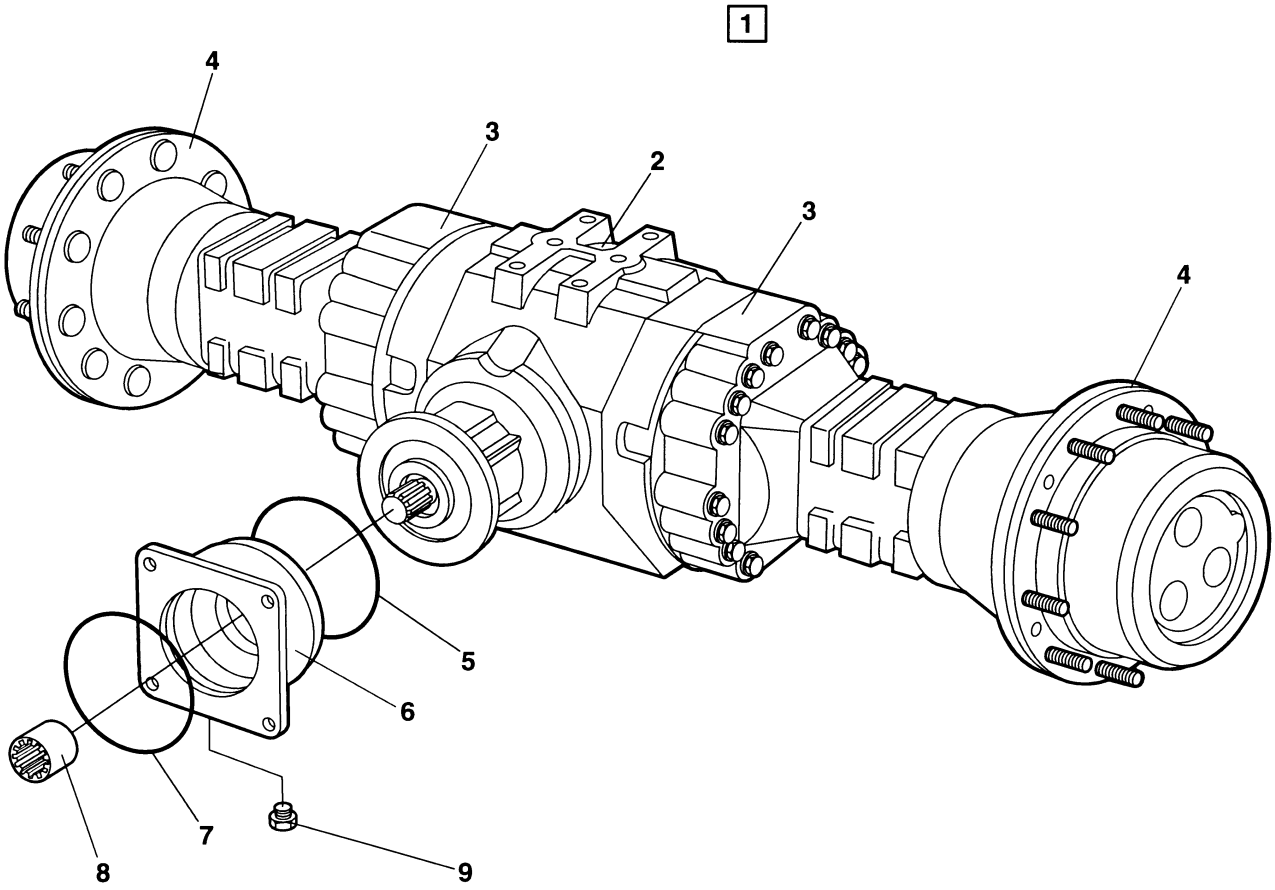


Fig. 90 Rear axle, Spare Parts picture no 16422

EXPLODED VIEW 16422 - REAR AXLE

Pos	Qty	Part No	Description	Notes
1	1	37 15 93	Rear axle	
	1	37 29 40	Rear axle	
2	1		.Differential (Axle P/N 37 15 93)	See fig. 91
	1		.Differential (Axle P/N 37 29 40)	See fig .92
3	2		.Brakes	See fig. 93
4	2		.Planetary gear	See fig. 94
5	1	93 60 58	.O-ring	
6	1	93 60 59	.Flange	
7	8	90 95 84	.O-ring	
8	1	93 60 60	.Splined sleeve	
9	1	92 68 10	.Plug	

EXPLODED VIEW 16423 - DIFFERENTIAL WITH LIMITED SLIP

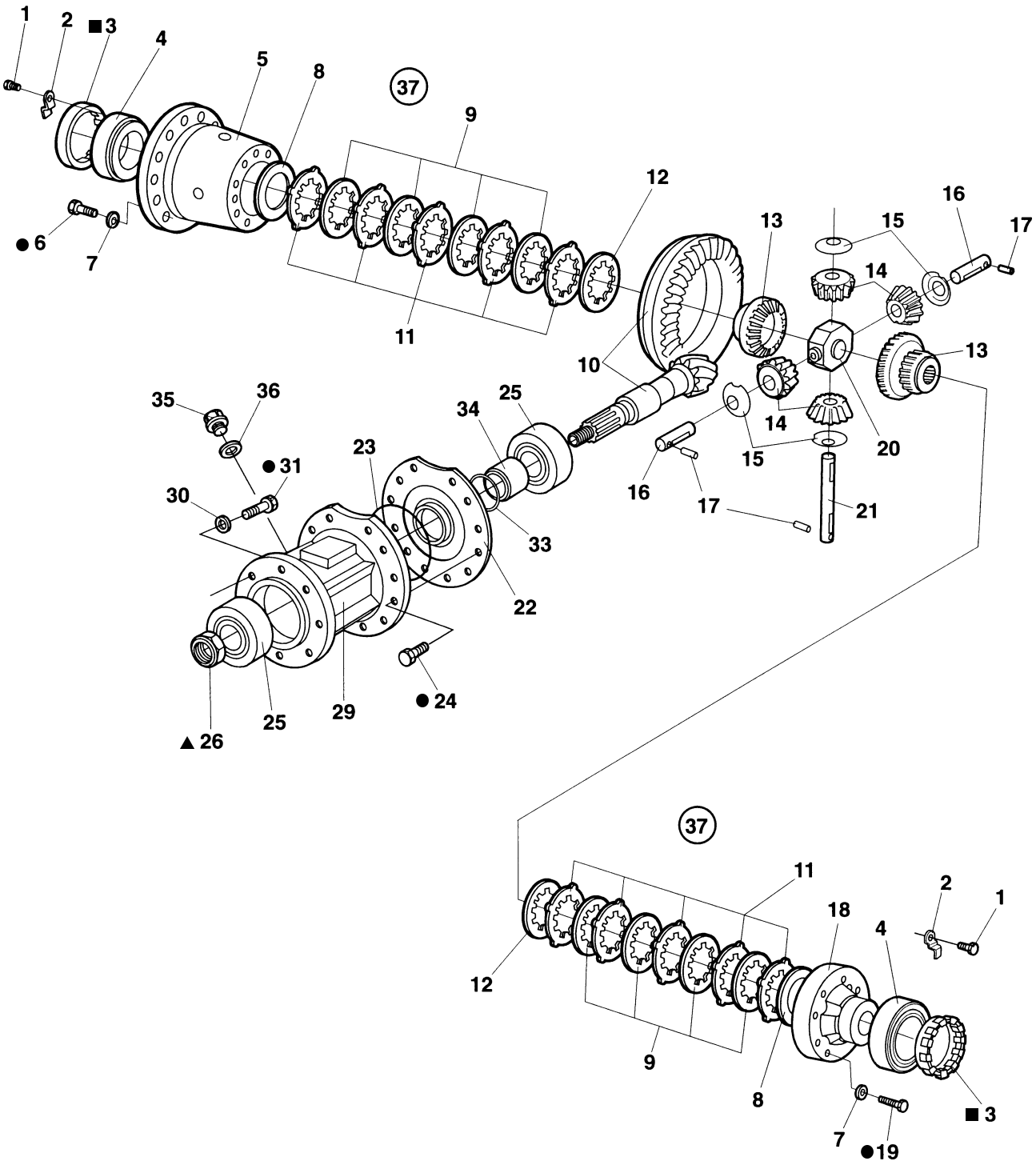


Fig. 91 Differential with limited slip, Spare Parts picture no 16423

■ *Loctite 222*
▲ *Loctite 243*
● *Loctite 270*

EXPLODED VIEW 16423 - DIFFERENTIAL WITH LIMITED SLIP

Pos	Qty	Part No	Description	Notes
1	2	90 95 47	Screw	
2	2	93 60 21	Locking plate	
3	2	93 60 22	Ring nut	
4	2	93 60 23	Bearing	
5	1	93 60 24	Differental carrier	
6	16	93 60 25	Screw	
7	24	93 60 26	Washer	
8	2	93 60 27	Shim	0.10 mm
	2	93 60 28	Shim	0.20 mm
	2	93 60 29	Shim	0.30 mm
9	8		Lim. slip disc	Use item 37
10	1	93 60 31	Bevel gear set	1)
11	10		Lim. slip disc	Use item 37
12	2		Lim. slip disc	Use item 37
13	2	93 60 34	Diff. side gear	
14	4	93 60 35	Diff. pinion	
15	4	93 60 36	Friction washer	
16	2	93 60 37	Pin	
17	3	93 60 38	Pin	
18	1	93 60 39	Cover	
19	8	93 60 40	Screw	
20	1	93 60 41	Shaft retainer	
21	1	93 60 42	Pin	
22	1	93 60 43	Shim	0.15 mm
	1	93 60 44	Shim	0.20 mm
	1	93 60 45	Shim	0.50 mm
	1	93 60 46	Shim	0.10 mm
23	1	93 60 47	O-ring	
24	12	93 60 48	Screw	
25	2	92 61 16	Bearing	
26	1	93 60 49	Ring nut	
29	1	93 60 50	Cover	
30	8	93 60 51	Washer	
31	8	90 95 82	Screw	
33	1	93 60 52	Shim	0.10 mm
	1	93 60 53	Shim	0.15 mm
	1	93 60 54	Shim	0.20 mm
	1	93 60 55	Shim	0.40 mm
	1	93 60 56	Shim	0.50 mm
34	1	93 60 57	Spacer	
35	2	90 95 44	Screw	
36	2	90 95 37	Washer	
37	2	93 61 08	Lim. slip disc kit	2)

1) Consists of crown wheel and pinion shaft

2) 1 kit include item 9, 11 and 12 for one side. 2 kits are needed for one axle.

EXPLODED VIEW 16497 - DIFFERENTIAL WITH NoSPIN

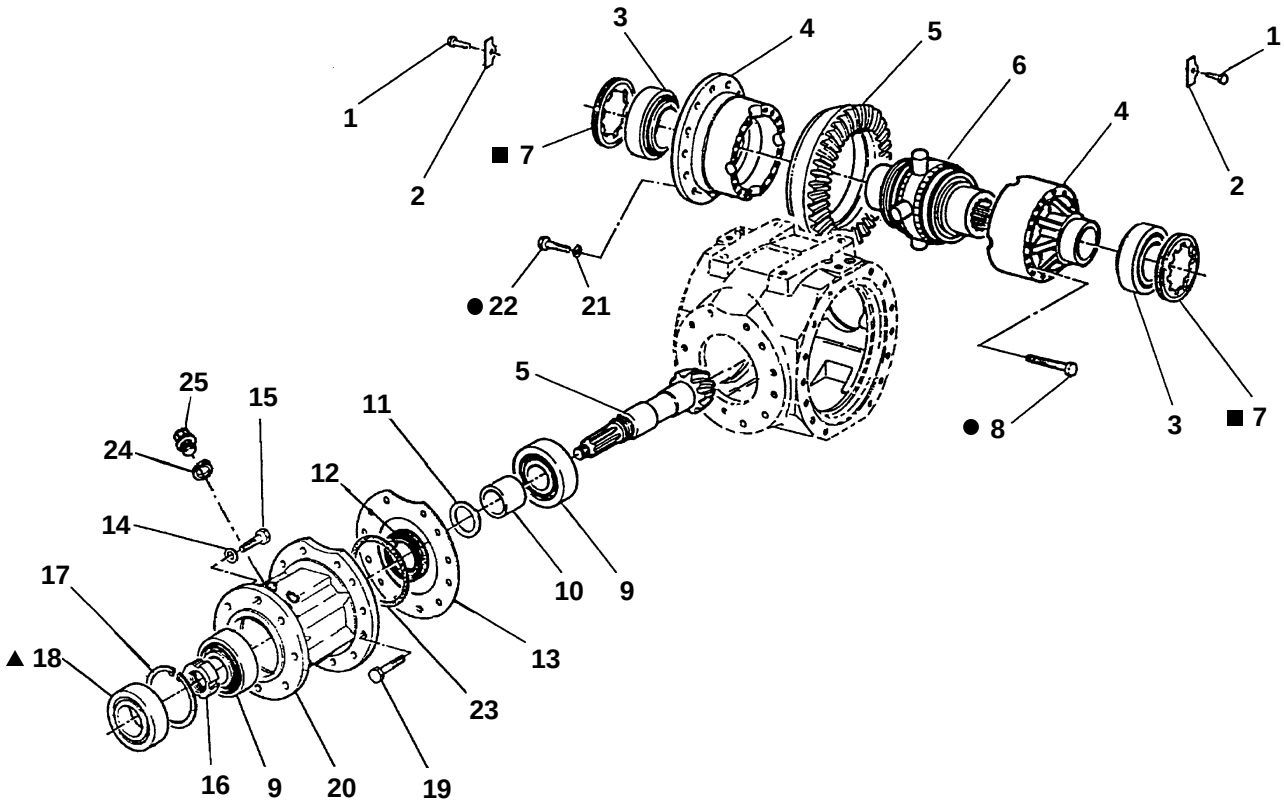


Fig. 92 Differential with NoSPIN, Spare Parts picture no 16497

■ *Loctite 222*
▲ *Loctite 243*
● *Loctite 270*

EXPLODED VIEW 16497 - DIFFERENTIAL WITH NoSPIN

Pos	Qty	Part No	Description	Notes
1	2		Hexagon bolt	
2	2		Sheet	
3	2		Taper roller bearing	
4	1		Differential carrier	
5	1		Bevel gear set	
6	1		No-spin differential	
7	2		Ring nut	
8	16		Cylinder bolt	
9	2		Bearing	
	2		Bearing	
10	1		Spacer	
11	1		Shim	
	1		Shim	
	1		Shim	
	1		Shim	
	1		Shim	
12				
13	1		Shim	
	1		Shim	
	1		Shim	
	1		Shim	
14	8		Spring washer	
15	8		Hexagon bolt	
16	1		Ring nut	
17				
18				
19	12		Hexagon bolt	
20	1		Cover	
21	16		Spring washer	
22	16		Hexagon bolt	
23	1		O-ring	
24	2		Washer	
25	2		Bolt	

EXPLODED VIEW 16424 - DIFFERENTIAL HOUSE AND BRAKES

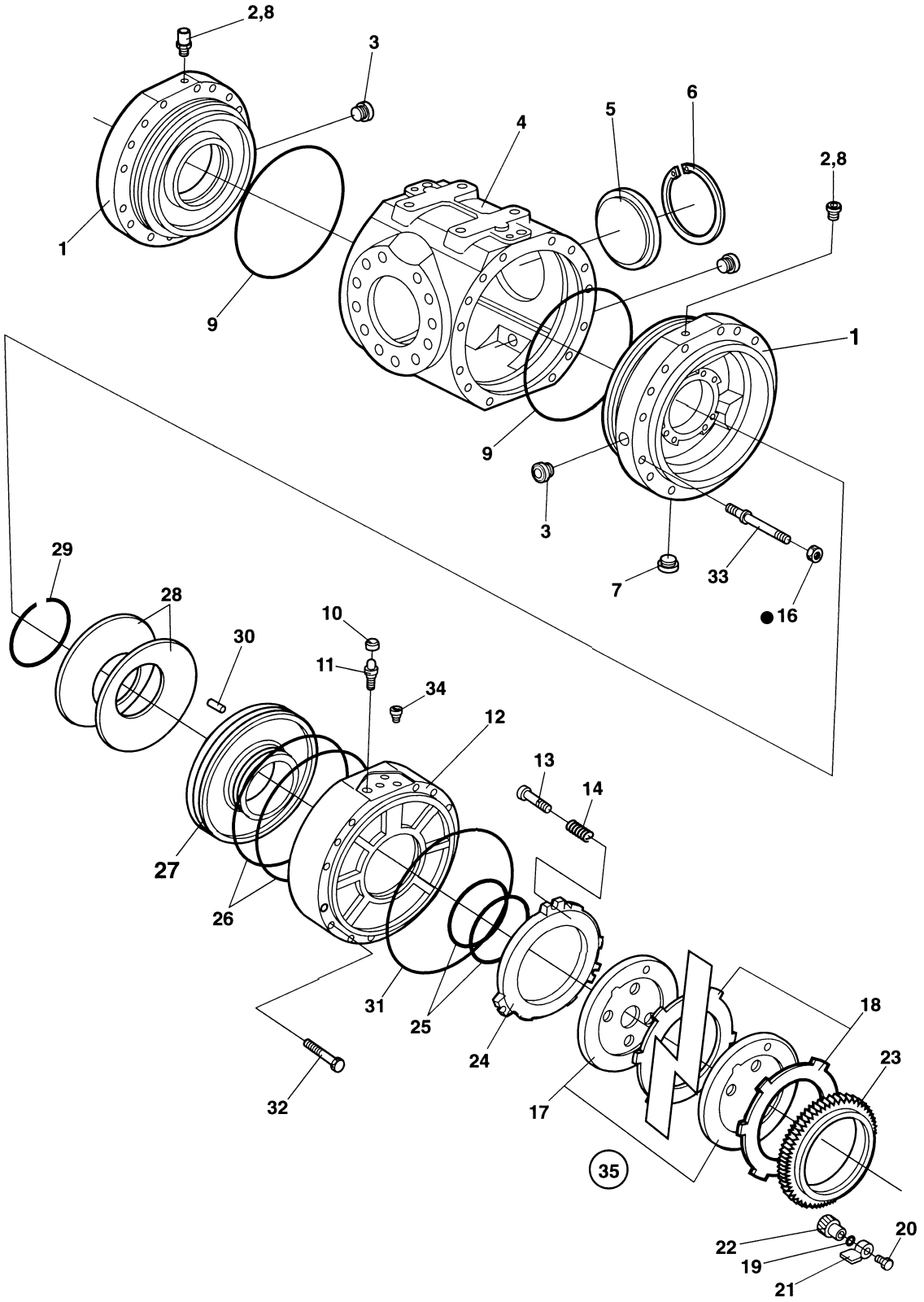


Fig. 93 Differental house and brakes, Spare Parts picture no 16424
● *Loctite 270*

EXPLODED VIEW 16424 - DIFFERENTIAL HOUSE AND BRAKES

Pos	Qty	Part No	Description	Notes
1	2	93 60 18	Intermediate housing	
2	1	90 09 26	Ventilator	
3	2	92 67 32	Plug	
4	1	93 60 19	Housing	
5	1	90 95 42	Plug	
6	1	92 96 17	Snap ring	
7	3	92 68 10	Magnet plug	
8	1	90 95 40	Plug	
9	2	93 60 20	O-ring	
10	2	93 60 87	Plug	
11	2	93 60 88	Bolt	
12	2	93 60 89	Intermediate cover	
13	6	93 60 90	Screw	
14	6	93 60 91	Spring	
15	6	93 60 92	Washer	
16	6	93 60 93	Nut	
17	10		Brake disc	Use item 35
18	10		Brake disc	Use item 36
19	2	92 96 91	O-ring	
20	2	90 09 37	Screw	
21	2	93 60 96	Locking plate	
22	2	93 60 97	Pinion	
23	2	93 60 98	Ring	
24	2	93 60 99	Brake disc	
25	4	93 61 00	O-ring	
26	4	93 61 01	O-ring	
27	2	93 61 02	Piston	
28	4	93 61 03	Spring	
29	2	93 61 04	Circlip	
30	2	93 61 05	Pin	
31	4	93 61 06	O-ring	
32	4	90 96 25	Screw	
33	6	93 61 07	Adjusting bolt	
34	4	90 96 15	Ventilator	
35	2	93 61 09	Brake disc kit	1)

1) 1 kit include item 17 and 18 for one side. 2 kits are needed for one axle.

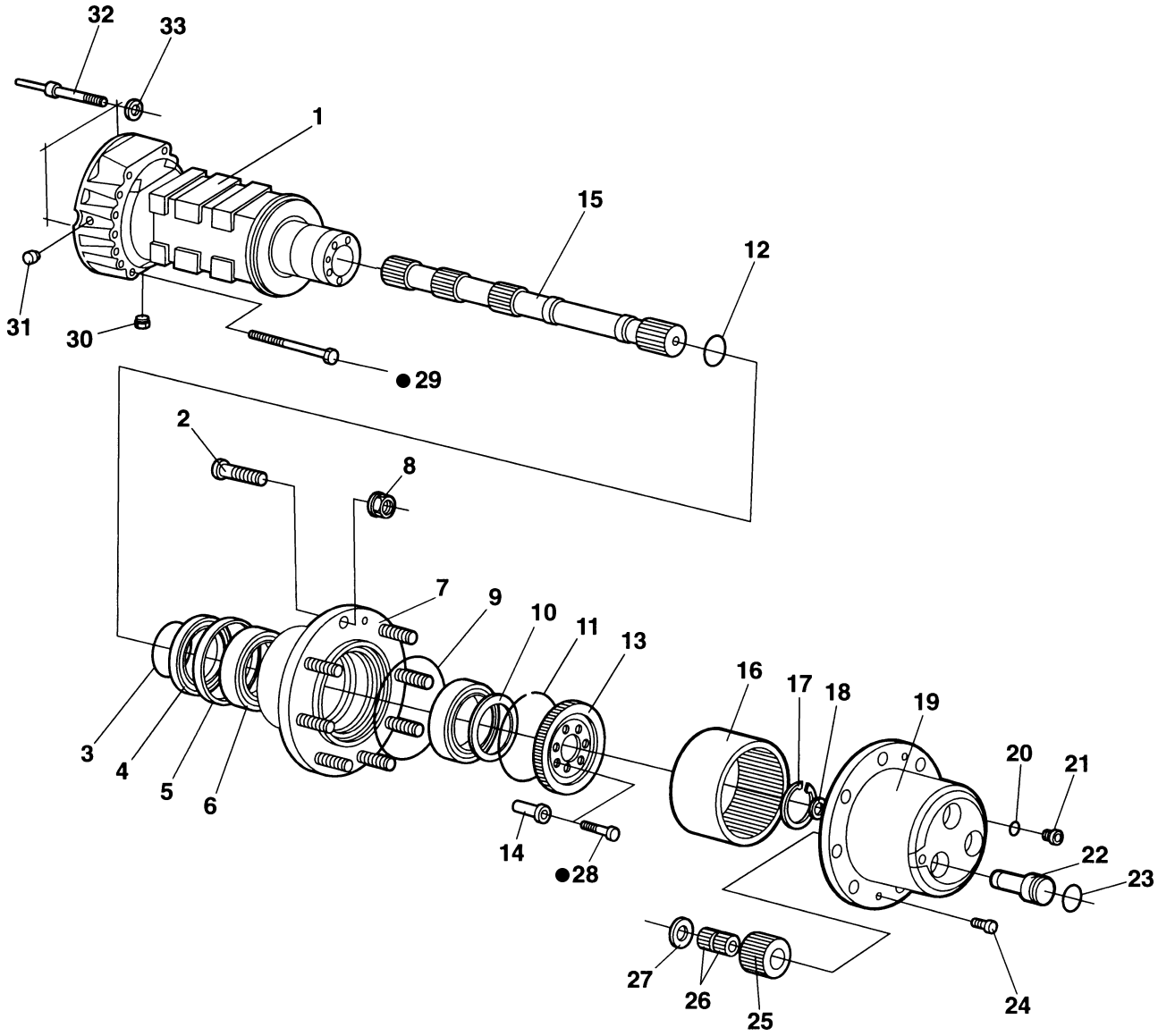


Fig. 94 Planetary gear, Spare Parts picture no 16425

● *Loctite 270*

EXPLODED VIEW 16425 - PLANETARY GEAR

Pos	Qty	Part No	Description	Notes
1	2	93 60 61	Housing	
2	16	92 67 81	Stud	
3	2	93 60 62	O-ring	
4	2	93 60 63	Spacer	
5	2	92 61 85	Seal	
6	4	93 60 64	Bearing	
7	2	93 60 65	Hub	
8	16	90 19 87	Nut	
9	2	93 60 66	O-ring	
10	2	93 60 67	Shim	0.15 mm
	2	93 60 68	Shim	0.20 mm
	2	93 60 69	Shim	0.50 mm
	2	93 60 70	Shim	0.30 mm
	2	93 60 71	Shim	0.10 mm
11	2	93 60 72	Snap ring	
12	2	93 60 73	Seal	
13	2	93 60 74	Flange	
14	16	90 96 05	Bushing	
15	2	93 60 75	Shaft	
16	2	93 60 76	Ring gear	
17	2	93 60 77	Circlip	
18	2	90 95 98	Friction washer	
19	2	93 60 78	Planet carrier	
20	2	90 96 07	Seal	
21	2	90 95 96	Plug	
22	6	93 60 79	Pin	
23	6	93 60 80	O-ring	
24	4	92 96 61	Screw	
25	6	93 60 81	Planet gear	
26	12	93 60 82	Bearing	
27	6	93 60 83	Washer	
28	16	90 95 89	Bolt	
29	24	93 60 84	Bolt	
30	2	92 68 10	Plug	
31	2	92 67 32	Plug	
32	4	93 60 85	Stud	
33	4	93 60 86	Nut	